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NAVAL AIR SYSTEMS COMMAND
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IN REPLY REFER TO

1500
Ser PMA2053/0700008
July 12, 2000

From: NAVAIRSYSCOM PMA 2053, Deputy Program Manager for Training Systems for General Aviation Systems and Weapons Programs
To: NAVAIRSYSCOM PMA 209A, Deputy Program Manager for Aircraft Combat Electronics

Subj: ARC-210 TRAINING SITUATION ANALYSIS

Encl: (1) Point Paper, Avionics Systems I-NTSPs should be Platform Specific
(2) ARC-210 Training Situation Analysis, 7 September 1999

1. NAVAIRSYSCOM PMA 209, Aircraft Combat Electronics, funded PMA 205, Naval Aviation Training Systems, to conduct this Training Situation Analysis (TSA) to analyze the effectiveness of the ARC-210 training provided to O-level personnel in order to make informed decisions regarding future ARC-210 system integrations.

2. Although this TSA is ARC-210 peculiar, it should be viewed as a case study representing training concerns for typical common avionics system integration.

3. This cover letter is added to accomplish two objectives: endorse the TSA's findings and recommendations presented by Intelligent Decisions Systems, Inc (IDSI); and present an overall improvement plan.

a. First, PMA 205 endorses IDSI's findings and recommendations in the TSA. Their analysis is based on interviews, surveys, and document analysis. The interviews were obtained from the KC-130, AV-8B, CH-53D/E, CH-46E, AH-1W, VFA-18C/D, and UH-1N communities located at MCAS Cherry Point, MCAS New River, NAS Lemoore, MCAS Miramar, MCAS Camp Pendleton, and NAS Oceana.

b. Second, PMA 2053E3 proposes an improvement plan based on firsthand observation of the working relationship between PMA 205 and PMA 209 as well as the contents of this TSA. This plan is identified in paragraphs 4 through 8 and is comprised of recommendations to PMA 205 Assistant Program Managers for Training Systems (APM(TS)s), platform Assistant Program Managers for Logistics (APMLs), PMA 209 APMLs and the PMA 205 Program Manager.

4. PMA 205 Common Avionics Training System Manager (TSM) Course of action.

a. Provide the TSA and brief the improvement plan to PMA 209 and PMA 205 leadership.

b. Individually Brief each PMA 205 APM(TS) whose platform integrates the ARC-210.

c. Post the TSA, with cover letter, on a website and notify the fleet ARC-210 users via Naval message.

d. Provide a follow up situation report in six months.

5. Suggested course of action for PMA 205 APM(TS)s.

a. Using this TSA as justification, request that platform APML conduct a formal pub review on the platform's technical manuals related to the ARC-210 system. Findings reveal a widespread dissatisfaction concerning content in platform publications. These same publications are the source from which curriculum is produced.

Use NATEC, NAMTRAGRU and PMA 209 personnel as well as fleet SMEs to conduct review.

b. Consider the NATEC field representatives a bona fide training system requiring logistic support. The NATEC role in integrating new avionics into a platform cannot be over emphasized.

All NATEC reps should be able to receive factory/initial training first hand. This will certainly be a difficult thing to schedule, possibly requiring multiple training events, but the degree to which the squadrons will rely on their expertise warrants this special consideration.

Recognizing that PMA 205 fills training requirements rather than creating them, consider producing training products specifically for NATEC personnel. Examples of some products that can enhance NATEC's training capabilities are text or web based lesson plans, Computer Aided Instruction (CAI), wall charts, posters, and simplified block diagrams. The NATEC field reps should identify exactly what product should be produced.

d. Personally call NATEC field reps to inquire about the training situation for the ARC-210.

e. Recognize PMA 209's dilemma concerning O-level training systems and technical publications. PMA 209 has limited influence aside from providing source documentation. Success or failure of PMA 209's avionics program is largely dependent on the quality of O-level training and technical publications provided to the fleet.

6. Suggested course of action for Platform APMLs.

a. Consult with APM(TS) noting the previous suggestions given.

7. Suggested course of action for PMA 209 APMLs.

a. Directly involve the platform APM(TS) in establishing initial/factory training for O-level personnel. The platform APM(TS) has the community knowledge and influence necessary to ensure effective training is established.

b. Look for opportunities to provide support to the NATEC field rep prior to formal training.

8. Suggested course of action for PMA 205 Program Manager.

a. Mandate that platform specific Initial-Navy Training System Plans (I-NTSP) vice multiple platform I-NTSPs be developed for each new avionics system incorporated into a specific platform. Currently an Initial-NTSP for a new avionics system includes multi-platform information. The multi-platform nature inhibits the document from becoming an effective planning tool.

b. Mandate that a platform specific Initial-NTSP be developed for each platform that adopts an avionics system that already has an established NTSP or an NTSP waiver. Currently there is no requirement to separately document the plan to integrate a new avionics system's training into the existing platform training. There is a requirement to update the platform's NTSP, but the time required to accomplish this often exceeds the fruition of the plan. Also a typical platform NTSP contains information on numerous avionics systems (as well as other systems) which makes the document cumbersome when trying to draft a plan that the platform PMA, PMA 205, and PMA 209 can come to consensus on. See enclosure (1).

9. Summary. The attached TSA and improvement plan that can greatly benefit the ARC-210 O-level training situation as well as future common avionics integrations. The Naval Air Systems Command point of contact is PMA-2053E3, ATC Jeff Rainwater, DSN 757-8138, commercial (301) 757-8138, or rainwaterja@navair.navy.mil.

K. J. MCILHENNY

Copy to:
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AIR 3.4.1

POINT PAPER

ATC(AW) Jeff Rainwater
PMA205-3E3/757-8138
11 July 2000

Issue: AVIONICS SYSTEMS INITIAL-NAVY TRAINING SYSTEM PLANS (I-NTSP) SHOULD BE PLATFORM SPECIFIC

BACKGROUND

— Currently an Initial-NTSP for a new avionics system includes multi-platform information. The multi-platform nature inhibits the document from becoming an effective planning tool.

— Currently there is no requirement to separately document the plan to integrate a new avionics system's training into the existing platform training. There is a requirement to update the platform's NTSP, but the time required to accomplish this often exceeds the fruition of the plan. Also a typical platform NTSP contains information on numerous avionics systems (as well as other systems) which makes the document cumbersome when trying to draft a plan that the platform PMA, PMA 205, and PMA 209 can come to consensus on.

DISCUSSION

— I-NTSPs are stand-alone Front-End Analysis documents, utilizing the format of NTSP parts 1 and 7. These documents do not fill the requirement for an NTSP. Upon completion of an I-NTSP for an avionics system, the continuation of Parts 2 – 6 must be developed, or OPNAV N889H must grant a waiver from NTSP development.

— The Initial-NTSP and NTSP for avionics systems are documents designed to describe the training peculiar to that system. When an avionics system's training is embedded in a platform training system, the I-NTSP and NTSP of the avionics system give reference to the platform NTSP without including much platform training detail.

— In the case on Organizational maintenance level to Depot maintenance level (O-D) avionics systems, the training support will be platform peculiar only. Hence, all training for that avionics system will be embedded in the existing platform training system.

RECOMMENDATION

— Mandate that platform specific Initial-Navy Training System Plans (I-NTSP) vice multiple platform I-NTSPs be developed for each new avionics system incorporated into a specific platform.

- Additionally, mandate that a platform specific Initial-NTSP be developed for each platform that adopts an avionics system that already has an established NTSP or an NTSP waiver.

- Benefits of the platform specific I-NTSP proposal. Clarity, ownership, consensus, fleet visibility, and means for documentation are improved by adopting this platform specific I-NTSP proposal.

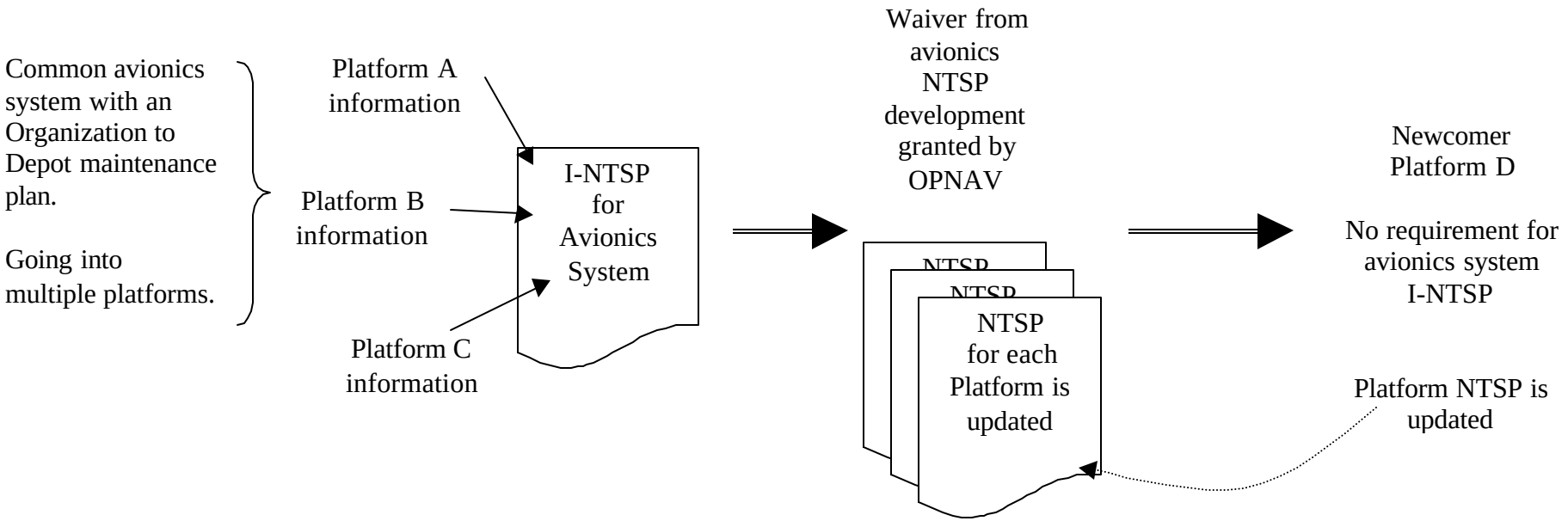
    - Clarity of the plan. One document describing initial training of an avionics system going into one platform will be more clear and robust than a single document describing training for multiple platforms. Also, there is no edict directing the development of an I-NTSP when it is known there will be an NTSP development waiver from OPNAV.

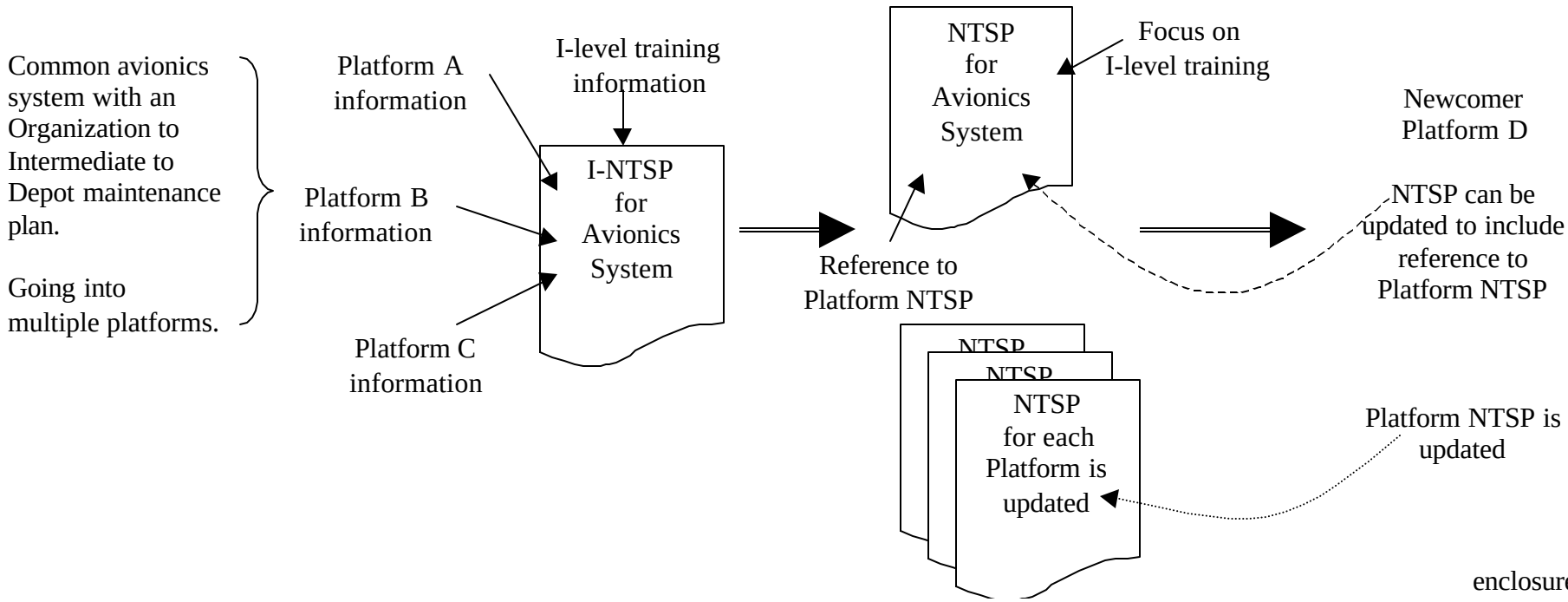
    - Gain platform ownership and multiple PMA consensus. With the platform's type/model/series (TMS) as well as the avionics system's nomenclature on the title of the I-NTSP, there will be a shift in the sense of ownership of the I-NTSP from a PMA 209 required document to a document required by both the platform PMA and PMA 209. This I-NTSP can serve as a mechanism from which the platform PMA, PMA 205 and PMA 209 can come to agreement on how best to provide initial training to the fleet.

    - Provide fleet personnel a faster, clearer look at the training plan for an avionics system coming to their platform. The priority a platform gives to producing an I-NTSP can be greatly influenced by the integration schedule. The initial integration of an avionics system can vary greatly among platforms, which can cause a delay in I-NTSP development for platforms that integrate the system later than others.

    - Provide a means for a newcomer platform to document I-NTSP data. In a situation where avionics system I-NTSPs and NTSP waivers already exist, the only current option is to update an established platform NTSP and not document anything else. A platform specific I-NTSP will provide the structure necessary to adequately develop a training plan to integrate a new avionics system into a platform.

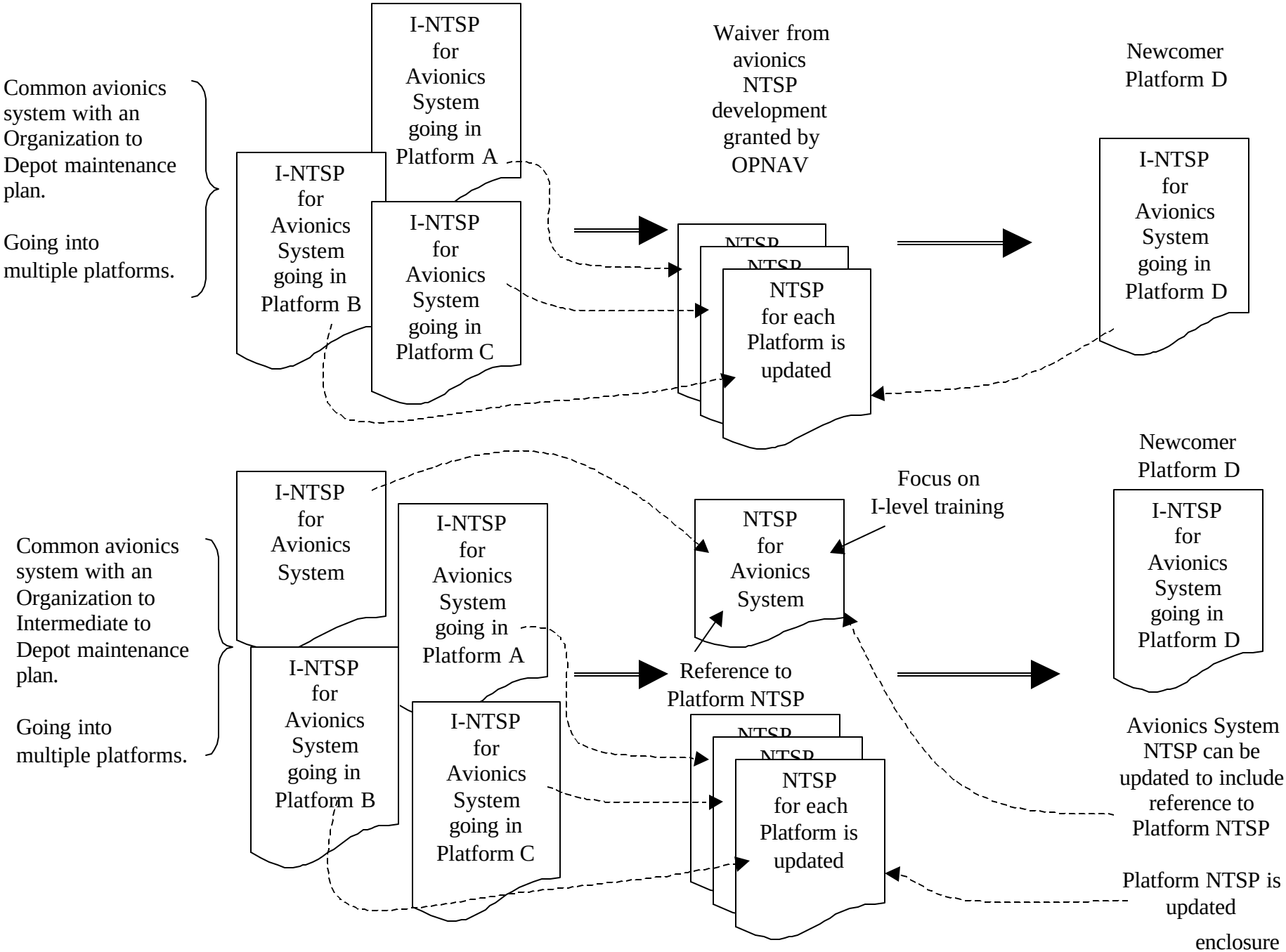
Current Initial-NTSP development flow





enclosure (1)

Proposed Initial-NTSP development flow



enclosure (1)

AN/ARC – 210
TRAINING SITUATION ANALYSIS

FINAL REPORT

Prepared for:

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enclosure (2)

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I. EXECUTIVE SUMMARY

This analysis examined the effectiveness and instructional delivery for the AN/ARC-210 (V) system. Results of the analysis provided critical information for making informed decisions regarding the future integration of AN/ARC-210 (V) system implementation into the fleet. The key areas examined included: AN/ARC-210 (V) background, system design/reliability, operator and maintenance performance of the systems (i.e., Are the current systems doing what they were designed to do?), technical documentation/publications and instructional curriculum/delivery. These decisions will be used to determine current and future AN/ARC-210 (V) training, integration and systems usage by fleet activities.

Throughout the analysis we examined how the AN/ARC-210 (V) system is trained, integrated operated and maintained in the squadrons and made recommendations to improve the training effectiveness within the Aviation Maintenance Training and the Air Combat Training Continuums.

Results of this training situation analysis indicated the AN/ARC-210 (V) system is performing as intended, and has proven to be a reliable alternative to its predecessor, the AN/ARC-182. Although the system itself was adequate, several areas in need of improvement were found that exist within the training, integration, operation and maintenance of the radio. Throughout the data collection phase of this effort, several common disconnects became apparent across all platforms and sites. As a direct result of the interviews with instructors, NATEC representatives, operators, and maintenance personnel several inconsistencies and inadequacies were revealed regarding the integration of the system. These integration issues are identified and discussed throughout this paper. The feedback that was received was consolidated and analyzed. Once the data analysis process was complete, several recommendations were made and can be found in the findings and recommendations section of this report.

II. INTRODUCTION

Naval Air Systems Command (NAVAIRSYSCOM), PMA2053E3 has contracted the development of this Training Situation Analysis (TSA) to identify emerging needs for maintenance and operator training of the AN/ARC-210 (V) system. The purpose of this analysis is to provide critical information for making informed decisions regarding the future integration of AN/ARC-210 (V) system implementation into the fleet. The key areas examined included: AN/ARC-210 (V) background, system design/reliability, operator and maintenance performance of the systems (i.e., Are the current systems doing what they were designed to do?), technical documentation/publications and instructional curriculum/delivery. These decisions will be used to determine current and future AN/ARC-210 (V) training, integration and systems usage by fleet activities.

Throughout the analysis we will examine how the AN/ARC-210 (V) system is trained, integrated operated and maintained in the squadrons and made recommendations to improve the training effectiveness within the Aviation Maintenance Training and the Aircrew Combat Training Continuums. The purpose of this technical report is to provide an analysis on the operation and maintenance of the system. This report discusses the following critical areas of the TSA: system background/integration into the Navy, analysis procedures, data collection methods, and findings/recommendations for future system integration and usage into the fleet.

III. BACKGROUND

The AN/ARC-210 (V) is a digital communication system with 2 way voice (normal/secure) functions and operates in AM/FM/UHF (SATCOM) satellite communications, VHF/normal or Electronic Protection (EP) modes. This system provides voice and data communications in normal, secure or jam-resistant modes via line-of-sight (LOS) or satellite communications (SATCOM) links. The AN/ARC-210 (V) Receiver-Transmitter (RT) is the major component for the multi-mode communications system. The system is capable of 25Khz wide band SATCOM as well as 5 Khz and 25 Khz DAMA SATCOM and is fully certified to MIL-STD-188-181-182/-183. The RT-1556 provides HAVE QUICK, HAVE QUICK II, and SINCGARS waveforms.

In August 1995, Rockwell Collins signed a contract to incorporate the Secretary of Defense's acquisition streamlining initiative into the AN/ARC-210 (V) system acquisition. This contractual agreement with NAVAIRSYSCOM permitted Rockwell Collins to manage the design and manufacturing process, guaranteeing system performance. Since the systems inception throughout 1996, the AN/ARC-210 (V) has become the Navy Standard V/UHF Airborne Communications System and provides joint mission interoperability across all platforms including land, sea-based vehicles and vessels. Since 1996 the RT-1556 system has been installed in many U.S. Navy, Marine Corps, Air Force and Army aircraft including F/A-18, V-22, AH-1W, B-1B, B-52, MH-53, CH-46, CH-17, C-5, RC-135, E-4B, KC-130, UH-1N, and UH-60.

Since the systems initial integration, improved versions of the AN/ARC-210/RT-1556 system, the AN/ARC-210/RT-1747 and the AN/ARC-210/RT-1794 have been developed and are in the process of being integrated into the fleet.

IV. DATA COLLECTION METHODS AND ANALYSIS

Throughout the data collection process, on-site visits were utilized to collect the relevant interview and survey data from the following platforms: KC-130, AV-8B, CH-53D/E, CH-46E, AH-1W, VFA-18C/D, and UH-1N. Within these platforms, the following Navy and Marine Corps Squadrons shown in Table 1. were selected, interviewed and surveyed based on the AN/ARC-210 (V) installation schedule and experience with the system:

TABLE 1. SQUADRONS USED FOR DATA COLLECTION

Squadrons Interviewed and Surveyed	
HMM-263	HMLA-167
HMT-302	VMGR-252
HMLA-269	VMGRT-253
HMM-266	VMA-223
HMT-204	VMA-261
HMH-461	VMA-542
VFA-22	VFA-94
VFA-113	VFA-125
VMAT-101	VMFA-225
VMFA-314	HMM-161
HMM-163	HMM-166
HMH-361	HMH-462
HMH-466	MALS-39
HMM-364	HMLA-367
HMLA-369	HMLA-267
HMMT-164	HMT-303
VFA-34	VFA-83
VFA-105	VMFA-121
VMAT-542	

Data were collected using multiple methods (interviews, surveys, and document analysis) and multiple sources (instructors, students, engineers, and maintenance personnel). Findings were analyzed separately from these sources and then reviewed as a composite. Comparing findings from different sources provided a more comprehensive view of the AN/ARC-210 system and strengthened confidence in the findings. Fleet surveys were completed by squadron personnel prior to interviews.

These surveys were utilized to determine the overall effectiveness of the system design and relevant source data. A more detailed explanation of each method follows.

Interviews: Various instructors, engineers, operator and maintenance personnel were interviewed. Interviews began with a discussion of the survey items. Respondents were asked to clarify ratings and explain difficulties in detail. The interview protocol is contained in *Appendix A*.

Fleet Surveys: The surveys were conducted with instructors, engineers, operator and maintenance personnel to determine the effectiveness of the training and integration of the systems within the fleet. We developed the surveys using the system components and task input from the maintenance personnel. In order to pinpoint potential areas for improvement we designed the surveys to capture specific tasks associated with the AN/ARC-210 (V) including system components and related tasks.

Survey Variables: Throughout the survey process respondents rated each system component to identify relevant sources of deficiencies on specific areas of difficulty and reasons why difficult. Survey participants ranked each system component and task on the survey using the following three variables and their respective ranking scales:

Frequency Ranking Scale: How often is the task performed?

1 = infrequently: 4 times or less per year
2 = moderate frequency: once a month
3 = high frequency: 2-10 times per month
4 = very high frequency: more than 10 times per month

Criticality Ranking Scale: What is the impact on the mission if the task is performed poorly?

1 = very low/no impact
2 = moderate impact (delays maintenance or operation but no damage to aircraft or injury to personnel)
3 = high impact (mission degradation, damage to aircraft or injury to personnel)
4 = very high impact (unable to perform mission, loss of aircraft, loss of life, safety of flight)

Difficulty Ranking Scale: How difficult is the task to perform?

1 = simple task - easy to learn and perform
2 = moderate task – moderately difficult to perform
3 = complex task – some parts of the tasks are difficult
4 = very complex – high level of difficulty throughout the task

Once we determined specific areas of difficulty, we began pinpointing the specific reasons for difficulty. Determining the reason relevant components and tasks are difficult is a critical discriminator when determining what problems exist when operating and maintaining the AN/ARC-210 (V) system. For example, the task might be difficult only because the operator or technician has performed the task too infrequently to master. The “reasons for difficulty” discriminators were identified and coded on the surveys as follows:

Reasons why difficult:

1 = No Formal Training
2 = Inadequate Publications
3 = Components are Difficult to Locate
4 = Complex System Interfaces
5 = Components Difficult to Maneuver/Reach
6 = No/limited Replacement Parts
7 = Tasks Performed Too Infrequently to Master

Document Review: Various AN/ARC210 (V) documentation including Training Course Control Documents, lesson plans, technical publications, navy training plans, system failure rate data, and computer-based training products (CBT) were also analyzed. General training recommendations for the communities surveyed and interviewed were made as a result of this review and can be found in the Overall Findings section of this report. More specific findings regarding each individual platform and military site were also made and can be found in the Findings and Recommendations section of this analysis.

The survey was administered to operators, Aviation Electronics Technicians (AT's), engineers, and instructors who have various degrees of experience operating, maintaining, and teaching the system. The operator and maintenance personnel were interviewed on the difficulty, frequency, and criticality of performing the following tasks for the various components of the system: initializing, operating, troubleshooting, identifying system interfaces, and removing/replacing the system. In addition to the fleet surveys and interviews, a documentation review was conducted. AN/ARC-210 (V) lesson plans, training guides, job aides and technical publications were reviewed to examine the instructional delivery and performance of the system.

Participants of this analysis were asked to respond to several questions regarding the tasks and components taught and performed on the AN/ARC-210 (V). These questions were presented in a survey format. A sample of the survey has been provided in *Appendix A* of this document. Once the data collection was completed, the relevant data was consolidated and analyzed to identify performance issues and make recommendations for optimum maintenance and operation of the AN/ARC-210 (V) system.

Throughout this training situation analysis several performance measures were analyzed to provide a complete picture of the impact of the AN/ARC-210 (V) system within the fleet. During the analysis the history of the development and integration of the system was also examined to determine if the current systems are fulfilling the expectations and needs of the users.

The following table provides a breakdown of respondents by platform, job, and military site:

TABLE 2: SURVEY SITE SUMMARY

SITE	Squadron	Platform	NUMBER OF RESPONDENTS					
			AT's	Reps	Pilots	Instr	Ops	Total
MCAS CHERRY POINT	VMA-223	AV8B	4		7			11
	VMA-542	AV8B	3					3
	VMAT-542	AV8B				1		1
	VMGR-252	KC-130	6					6
	VMGRT-253	KC-130	5	1	1	4		11
MCAS NEW RIVER	HMM-263	CH-46E	1					1
	HMM-266	CH-46E	1				**1	2
	HMLA-269	UH-1N	4		5			9
	HMLA-269	AH-1W			1			1
	HMM-266	H-1	1					1
	HMLA-167	UH-1N	3		5			8
	HMM-266	H-1	1					1
	HMT-204	CH-46E	3				**1	4
	HMM-266	CH-53E	1					1
	HMT-302	CH-53E	4		2	4		10
	HMH-461	CH-53E	5		2			7
	HMT-204	CH-53E		4		2		6
NAS LEMOORE	VFA-22	F-18C	4					4
	VFA-113	F-18C	2					2
	NAMTRA	F-18C				*3/2PM's		5
	VFA-125	F-18C	2					2
	VFA-94	F-18C		1	2			3
MCAS MIRAMAR	VMAT-101	F-18D	1		3			4
	VMFA-225	F-18C	1		6			7
	VMFA-314	F-18C	4		1			5
	VMFA-121	F-18D	1					1
	HMH-361	CH-53E	6		1			7
	HMH-466	CH-53E	3		1			4
	HMH-462	CH-53E	6		4			10
	HMM-163	CH-46E	2					2
	HMM-166	CH-46E	2		3			5
	HMM-161	CH-46E	2		4			6

TABLE 2: SURVEY SITE SUMMARY (cont.)

Site	Squadron	Platform	NUMBER OF RESPONDENTS					
			AT's	Reps	Pilots	Instr	Ops	Total
MCAS CAMP PENDELTON	MALS-39	H-1	2					2
	HMM-364	CH-46E	4		2			6
	HMLA-367	AH-1W			1			1
	HMLA-367	UH-1N			1			1
	HMLA-369	H-1	1					1
	HMLA-267	UH-1N			4			4
	HMLA-267	AH-1W			1			1
	HMLA-267	H-1	6					6
	HMLA-367	H-1	1					1
	HMMT-164	CH-46E	1		1			2
	HMT-303	H-1	10			2		12
	NATEC	H-1/CH-46E		1				1
NAS OCEANA	VFA-34	F/A-18C	4		2			6
	VFA-105	F/A-18C			4			4
	VFA-83	F/A-18C	1	1	4	2		8
SITE SUMMARY								213

*Note- Site NAS Lemoore includes 3 Instructors and 2 Program Managers
** Note- Ops include general air crew personnel (i.e., Naval Flight Officers, In-flight technicians, flight engineers….)

V. OVERALL FINDINGS

The following findings were reported consistently across all of the platforms studied and throughout the various squadrons within each platform:

Technical Publication Issues

A formal technical publication review is highly recommended based on the following overall findings:

- Several communities are still awaiting the receipt of official publications for the system (i.e., communities are currently relying on interim publications).

- Publications need to be modified to include:
  - More detailed trouble shooting procedures and fault isolation information
  - Better schematics/diagrams to accurately display component location, identify wiring by location, and wire numbers within the technical publications
  - Better organization, technical publications are not "user friendly", are too vague, and need to be organized into a standardized format (i.e., table of contents, and designated sections and standardized work packages for the system)
  - Airborne and detachment personnel are relying on squadron for publication data
  - Information regarding the CYZ-10/DTD and advanced capabilities of the radio (i.e., HAVEQUICK and SINCGARS modes)

Training Related Issues

A formal training review should be conducted and modifications should be made based on the following overall findings:

- Little formalized training has been provided on the system to squadron personnel:

  - Formal training is vague and does not include in-depth information regarding the advanced capabilities of the system, therefore optimum utilization of the HAVEQUICK and/or SINGCARS modes are achieved usually after a prolonged trial and error learning curve evolution (i.e., operator's are not utilizing the system to it's fullest capabilities or electronic protection modes)
  - Little to no equipment is available to train on (i.e., modified simulators).
  - Due to staffing/manning problems training time is limited, personnel have little to no training on the system (i.e., instructors stated that "system prioritization and training is taking a back seat to crisis management")
  - Training squadrons are not set up to handle secure material (i.e., they do not have access to the CYZ-10/DTD, therefore they are not learning how to utilize the Electronic Protection modes)
  - Currently, there is non-platform specific computer-based training (AN/ARC-210 (V) Interactive Training System developed for PMA209) available at the squadrons to

supplement formal training, however not every squadron is aware of and has access to this capability.
  - Operators and maintenance technicians stated that "tasks are performed too infrequently to master" (i.e., need more hands-on experience with the system).
  - NATEC representatives have provided limited technical training, squadrons do not have anyone to teach advanced aspects of the system.
  - There is no platform training standardization for operator and maintenance personnel
  - Squadron personnel stated that they are learning the system through "trial and error" and "word of mouth".
  - Currently, there is little to no information sharing regarding system operation and maintenance (i.e., lack of adequate "corporate knowledge").
  - There is a significant time gap between formal training and system utilization (i.e., no refresher training).
  - Maintenance personnel stated that "troubleshooting is difficult due to load problems with the CYZ-10/DTD as a result of lack of training".

- The AN/ARC-210 Fill Program (AFP) is an excellent DOS-based software program but needs to be modified, currently the program is not IT-21/Windows NT compliant (i.e., program must be booted off of the disc and certain squadrons are not aware of this "work around"). Per Mark West at the August 99 AN/ARC-210 ILSMT-Windows NT version of AFP program due out sometime in "00" or Y2K.

VI. INDIVIDUAL SITE FINDINGS AND RECOMMENDATIONS

The following section is a detailed report of the findings that resulted from the data consolidation and analysis. The data contained in these findings were gathered throughout the data collection process during site visits at the following locations: MCAS Cherry Pt., MCAS New River, NAS Lemoore, MCAS Miramar, MCAS Camp Pendleton, and NAS Oceana. During the site visits a total of 92 platform personnel were interviewed and surveyed. This summation contains a detailed explanation of the findings and recommendations for each site, squadron, and platform that is included in the data analysis.

MCAS CHERRY PT.

KC-130 COMMUNITY

Findings:

Technical Publication Issues

1. Interim publications are being utilized, community is still awaiting the receipt of official publications for the system (i.e., at the time of survey official publications were 60 days late).

2. Maintenance technicians communicated the need for more detailed troubleshooting procedures and fault isolations within technical publications.
3. Maintenance technicians communicated the need for better schematics/diagrams to accurately display component location, identify wiring by location, and wire numbers within the technical publications.
4. Maintenance technicians stated that the technical publications are not "user friendly", are too vague, and need to be organized into a standardized format (i.e., table of contents, and designated sections).
5. Maintenance technicians are utilizing the preliminary GPS/AN/ARC-210 (V) C/KC-130 Flight Manual to learn the system and develop their own troubleshooting procedures (in lieu of official publications).
6. Operators are utilizing their own KC-130 Communication-Navigation Management System Operational Guide (in lieu of official publications) to learn the system, this manual is primarily for CDNU operation and only covers the AN/ARC-210 system in emergency mode operation.
7. Squadrons do not have enough available copies to support detachment personnel.

Training Related Issues

1. Formal maintenance training (CIN C-102-4511) is in place but little to no equipment is available to train on (i.e., modified simulators).
2. Due to staffing/manning problems training time is limited, personnel have little to no training on the system (i.e., instructors stated that "system prioritization and training is taking a back seat to crisis management").
3. Training squadron is not set up to handle secure material (i.e., HAVEQUICK, SINCGARS).
4. Currently, there is non-platform specific computer-based training (AN/ARC-210 (V) Interactive Training System developed for PMA209) available at the squadrons to supplement formal training, however not every squadron is aware of and has access to this capability.
5. Operators and maintenance technicians stated that "tasks are performed too infrequently to master" (i.e., need more hands-on experience with the system).
6. Operator's and Maintenance personnel are not utilizing the system to it's fullest capabilities (i.e., operating in Electronic Protection (EP) modes).
7. NATEC representatives have provided limited technical training, squadrons do not have anyone to teach advanced aspects of the system.
8. There is no platform training standardization for operator and maintenance personnel.
9. Squadron personnel stated that they are learning the system through "trial and error" and "word of mouth".
10. Currently, there is little to no information sharing regarding system operation and maintenance (i.e., lack of adequate "corporate knowledge").
11. There is a significant time gap between formal training and system utilization (i.e., no refresher training).

Maintenance Procedure Issues

1. Due to antiquated equipment and aircraft, electrical shorts are effecting system operation and maintenance.
2. Squadrons do not have adequate troubleshooting/fault isolation and system operation checklists (in many cases they are developing their own materials).
3. Squadron personnel felt that they are not receiving enough hands-on time with the system.

In addition to conducting maintenance personnel interviews, a review and analysis of the KC-130 Communication and Navigation Upgrade (C-102-4511) lesson plan was completed. The results of the analysis and review indicated that the lesson plan is adequate but should be modified to include the applicable recommendations listed below.

Recommendations:

Technical Publication

1. Provide squadrons with official "publications."
2. Modify publications to incorporate detailed troubleshooting procedures, and fault isolation information.
3. Modify publications to include more detailed wiring diagrams and schematics to accurately display component location and system functionality.
4. Provide copies of official and interim publications to airborne and detachment operations.
5. Conduct formal publication review prior to the distribution of official technical publications.

Training Related

1. Increase the amount of theory of operation, system functionality, system interface, and troubleshooting procedures being taught at the FRESTS.
2. Provide more hands-on technical training pertaining to system theory, functionality, troubleshooting/fault isolation and full system capability training to all operator and maintenance personnel.
3. Review and standardize training for all squadrons.
4. Provide additional platform specific computer-based training to supplement formal, hands-on, and refresher training.
5. Provide training squadrons with the capability to handle the loading of secure material (i.e., HAVEQUICK, SINCGARS) to fully teach system capabilities.
6. Provide NATEC training on a regular basis to provide instruction on the advanced aspects of the system.

Maintenance Procedure Items

1. Provide squadrons with approved detailed troubleshooting/fault isolation and system operation checklists.

AV8B COMMUNITY

Findings:

Technical Publication Issues

1. Maintenance technicians stated that "technical publications are too vague and do not contain detailed troubleshooting matrices and fault isolation procedures".
2. Maintenance technicians also stated that "the publications do not contain detailed schematics/diagrams that accurately display component location, wiring locations, and wire numbers.
3. Squadrons have not received modified publications that include system updates for the 1556A.

Training Related Issues

1. Formal training is currently in development and was to be completed by 15 June 99.
2. Squadrons just received the system March 99 and did not receive any training materials with the system (i.e., they have the equipment but little to no formal system information).
3. Squadrons did not receive system integration training.
4. System interface training was not received.
5. Little to no NATEC training was provided to the squadrons.
6. Only a limited number of operators were provided with basic technical training at the FREST level and full system capabilities (i.e., electronic protection modes) have not been taught or utilized.

Recommendations:

Technical Publication

1. Modify official publications to incorporate 1556A modifications and relevant system interface information (i.e., RCU and CDC/CDM interfaces).
2. Provide official publications and operating manuals to operator and maintenance personnel.
3. Modify publications to incorporate detailed troubleshooting procedures, and fault isolation information.
4. Modify publications to include more detailed wiring diagrams and schematics to accurately display component location.

Training Related

1. Provide NATEC training to all maintenance and operator personnel to provide more advanced training on the system (i.e., loading and operating system in electronic protection modes).
2. Provide more hands-on training pertaining to system theory, functionality, and troubleshooting/fault isolation to all maintenance personnel.

3. Provide system interface information to the FREST and incorporate information into the formal training curriculum.
4. Provide platform specific computer-based training to provide refresher training and system familiarity (many tasks are being performed too infrequently to master).
5. Provide publication data to airborne and detachment personnel.

MCAS NEW RIVER

AH-1W COMMUNITY

Findings:

Technical Publication Issues

1. Squadron personnel stated that "technical publications are inadequate (i.e., vague and outdated) and lack detailed troubleshooting/fault isolation, component location and system functionality information".
2. Maintenance technicians communicated the need to modify the publications to provide more detailed flow charts and schematics (squadrons are currently relying on NATEC representatives to provide this information).
3. Operators and maintainers are creating their own checklists and training guides to compensate for insufficient publications and manuals.
4. The NATOPS manual is currently being updated and has yet to be provided to squadrons.
5. The BellTectron helicopter manufacturer's manual was provided to operators and has been utilized for basic system understanding but contains too great a level of detail for efficient utilization at the squadron level."
6. The AN/ARC -210 manufacturer's manual does not provide a detailed explanation of platform specific scan list functions and operations (i.e., operator's are developing and relying on their own checklists for this information).
7. Squadron personnel stated that "published loading procedures for electronic protection and logic converter modes are too vague and unreliable".

Training Issues

1. Little to no formal training has been provided to the squadrons, operator and maintenance personnel.
2. Currently there is no information sharing capability to learn advanced aspects of the system, operator and maintenance personnel stated that they are relying on "trial and error" and "word of mouth" to learn the system.
3. Currently the squadrons are not getting enough technical training and hands-on training with the system.
4. Training squadron does not have modified flight simulators that include current systems (current simulator is outdated).
5. The operators are not receiving system functionality training on the advanced aspects of the radio, currently they are not operating the system to its fullest capabilities.

6. Currently, squadron level technical training syllabus does not include AN/ARC-210 system.

System Design Issues

1. Location of Logic Converter (CV) is difficult to access (i.e., not clearly marked in the aircraft).
2. Squadrons do not have load cable for electronic protection modes (i.e., loading from DTD to A/C).
3. AH-1W has very complex wiring components and is difficult to operate and maintain (i.e., publications contain vague schematics and wiring diagrams).
4. Operator and maintenance personnel are experiencing "bleed over" with the IFF system because both systems utilize the same antenna.

Recommendations:

Technical Publication

1. Modify publications to include more detailed troubleshooting/fault isolation, component location, and system functionality information.
2. Modify publications to include more detailed flow charts and schematics (squadrons are currently relying on NATEC representatives to provide this information).
3. Provide squadron personnel with standardized operator and maintenance checklists/job aides and training guides should be provided (currently, pilots and maintainers are developing their own) to promote information sharing within the squadrons.
4. Modify the manufacturer's manual to explain platform specific scanlist functions and operations.
5. Modify published loading procedures for electronic protection and logic converter modes to include detailed information on the two modes.

Training

1. Provide more formal and hands-on training to the squadrons (both operator and maintenance personnel).
2. Establish an information sharing capability (i.e., standardized work packages) for the advanced aspects of the system, currently the operator and maintenance personnel are relying entirely on "trial and error" and "word of mouth" to learn the system.
3. Modify training simulators and squadron equipment to include current systems (current simulators are outdated).
4. Provide detailed system functionality training on the advanced aspects of the radio, currently they are not operating the system to its fullest capabilities.
5. Modify the technical training syllabus to include the AN/ARC-210 system.
6. Provide platform specific computer-based training to the squadrons for refresher training on the system.

UH-1N COMMUNITY

Findings:

Technical Publication Issues

1. Squadron personnel stated that "current technical publications are inadequate (i.e., vague and outdated) and lack detailed troubleshooting/fault isolation, component location and system functionality information".
2. Maintenance technicians also stated that "publications lack detailed flow charts and schematics (squadrons are currently relying on NATEC representatives to provide this information)".
3. Operators and maintainers are creating their own checklists and training guides to compensate for insufficient publications and manuals.
4. The NATOPS manual is too vague and not "user friendly".
5. The BellTectron helicopter manufacturer's manual was provided and has been utilized for basic system understanding but is too complicated to fully utilized.
6. Squadrons are lacking standardized work packages.

Training Issues

1. Little to no formal training has been provided to the operational squadrons, operator and maintenance personnel are lacking formal lesson guides.
2. Currently, there is no information sharing capability to learn advanced aspects of the system, operator and maintenance personnel are relying entirely on "trial and error" and "word of mouth" to learn the system.
3. Operator and maintenance personnel are not receiving enough technical training and hands-on training with the system.
4. Training Squadrons have antiquated simulators that do not include current systems (current simulator is outdated and only contains AN/ARC 182 system).
5. Operators are not receiving system functionality training on the advanced aspects of the radio, currently they are not operating the system to its fullest capabilities.
6. The technical training syllabus does not include AN/ARC-210 system.

System Design Issues

1. Location of Logic Converter (CV) is difficult to access.
2. Squadrons do not have load cable for electronic protection modes (i.e., loading from DTD to A/C).
3. Current hardware does not include Automatic Direction Finder (ADF).
4. Operator and maintenance personnel are experiencing "bleed over" with the IFF system.

Recommendations:

Technical Publication

1. Modify official publications to include more detailed troubleshooting/fault isolation, component location and system functionality information.
2. Modify official publications to include more detailed flow charts and schematics (squadrons are currently relying on NATEC representatives to provide this information).
3. Provide standardized operator and maintenance checklists/job aides and training guides (currently, pilots and maintainers are developing their own) to promote information sharing within the squadrons.
4. Modify and provide detailed information to squadron personnel on the loading procedures for electronic protection and logic converter modes.

Training

1. Provide more formal and hands-on training to all operator and maintenance personnel.
2. Establish an information sharing capability (i.e., standardized work packages) to learn advanced aspects of the system, operator and maintenance personnel are relying on "trial and error" and "word of mouth" to learn the system.
3. Modify training simulators to include current systems (current simulator is outdated).
4. Provide operators with system functionality training on the advanced aspects of the radio, currently they are not operating the system to its fullest capabilities.
5. Modify technical training syllabus to include AN/ARC-210 system.
6. Provide platform specific computer-based training to the squadrons for re-fresher training (currently squadrons have adequate hardware but are missing platform specific courseware).

CH-46E COMMUNITY

Findings:

Technical Publication Issues

1. Squadron personnel stated that "the technical publications are inadequate, and lack detailed troubleshooting/fault isolation, component location and system functionality information".
2. Maintenance technicians stated that "technical publications also lack detailed flow charts and schematics for troubleshooting".
3. Operators and maintainers are creating their own checklists and training guides to compensate for insufficient publications and manuals.

Training Issues

1. Little to no formal training has been provided to operational squadrons.
2. There is no formal information sharing capability, operator and maintenance personnel are relying on "trial and error" and "word of mouth" to learn the system.

3. Operator and maintenance personnel stated that “they are not receiving enough technical training and hands-on training with the system”.
4. Simulators do not include the CYZ-10/DTD component.
5. Operators stated that “there is not enough system functionality training on the advanced aspects of the radio”, currently they are not operating the system to its fullest capabilities and they are just starting to load electronic protection modes.
6. Squadrons have non-platform specific courseware (AN/ARC-210 (V) Radio Interactive Training System (ITS) developed for PMA209), but they are not fully utilizing this capability.
7. Due to staffing/manning problems training time is limited, personnel have little to no training on the system.
8. Little to no information sharing is occurring within squadrons (i.e., some squadron maintenance and operation personnel did not know of available computer-based training courseware).
9. Electronic protection modes are not covered in enough detail in the current curriculum.

System Design Issues

1. Antenna location is creating weak signals/frequencies and communication problems.
2. Remote Head component locks up during operation and will not take frequencies.

Recommendations:

Technical Publication

1. Modify official publications to include more detailed troubleshooting/fault isolation, component location, and system functionality information.
2. Modify official publications to include more detailed flow charts and schematics (squadrons are currently relying on NATEC representatives to provide this information).
3. Provide standardized operator and maintenance checklists/job aides and training guides (currently, pilots and maintainers are developing their own) to promote information sharing within the squadrons.
4. Provide squadron personnel with detailed loading procedures for electronic protection and logic converter modes.

Training

1. Provide more formal and hands-on training to operator and maintenance personnel.
2. Provide an information sharing capability (i.e., standardized work packages) to teach the advanced aspects of the system, operator and maintenance personnel are relying on “trial and error” and “word of mouth” to learn the system.
3. Modify simulators to include CYZ-10/DTD components.
4. Provide detailed system functionality training on the advanced aspects of the radio to all squadron personnel, currently they are not operating the system to its fullest capabilities.
5. Provide platform specific computer-based training to the squadrons for re-fresher training (currently, squadrons have adequate hardware but do not have platform specific courseware).

6. Utilize current non-platform specific courseware for refresher and supplemental training.

System Design

1. Re-examine the antenna location, dual antennas should be provided to solve weak communication issues with signals and frequencies.

CH-53E COMMUNITY

Findings:

Technical Publication Issues

1. Squadron personnel stated that "technical publications are inadequate, they lack detailed troubleshooting/fault isolation, component location, and system functionality information".
2. Maintenance technicians stated that "technical publications lack detailed flow charts, schematics, and wiring diagrams for troubleshooting".
3. Operators and maintainers are creating their own checklists and training guides to compensate for inadequate publications and manuals.
4. Operator's stated that the "NATOPS manual is too vague".

Training Issues

1. Little to no training has been provided to the squadrons, operator and maintenance personnel.
2. Currently there is no information sharing capability to learn advanced aspects of the system, operator and maintenance personnel are relying on "trial and error" and "word of mouth" to learn the system.
3. Operator and maintenance personnel stated that they "have not been provided with enough technical training and hands-on training with the system (i.e., component locations, system functionality and circuit analysis descriptions)".
4. Operators stated the need for more system functionality training on the advanced aspects of the radio, currently they are not operating the system to it's fullest capabilities, they are just starting to load electronic protection modes.
5. The FREST has platform specific courseware (developed by Don Patterson & Associates) and has utilized the courseware to develop formal lesson plans, but are not utilizing the computer-based training as a supplement to formal training.
6. Due to staffing/manning problems training time is limited, personnel have little to no training on the system.
7. Little to no information sharing is occurring within squadrons (i.e., some squadron maintenance and operation personnel did not know of available platform specific computer-based training courseware).
8. Current training curriculum is well written (C-102-9945A) and covers full system capability (i.e., detailed loading and operating guides for the electronic protection modes).

System Design Issues

1. Single antenna location is creating weak signal and frequency problems.
2. Modified logic converter (CV) wires are creating troubleshooting difficulties (i.e., complex wiring).
3. Radio range is limited and volume's are inconsistent with other radios (i.e., AN/ARC-210 volumes are not as loud).

Maintenance Design Issue

1. Squadrons are currently experiencing slight corrosion problems with the receiver/transmitter mounts.

Recommendations:

Technical Publication

1. Modify official publications to include more detailed troubleshooting/fault isolation, component location and system functionality information.
2. Modify official publications to include more detailed flow charts and schematics (squadrons are currently relying on NATEC representatives to provide this information).
3. Provide standardized operator and maintenance checklists/job aides and training guides (currently, pilots and maintainers are developing their own) to promote information sharing within the squadrons.
4. Provide detailed loading procedures for electronic protection and logic converter modes.

Training

1. Provide more formal and hands-on training to all operator and maintenance personnel.
2. Establish an information sharing capability (i.e., standardized work packages) to teach advanced aspects of the system, operator and maintenance personnel are relying on "trial and error" and "word of mouth" to learn the system.
3. Provide computer-based training to the operational squadrons for refresher training (currently squadrons have adequate hardware but lack platform specific courseware).

System Design

1. Re-examine antenna location, providing dual antennas may solve weak communication issues with signals and frequencies.

Maintenance Procedure

1. Establish and conduct formal visual inspection procedures (i.e. 56 day maintenance requirement card) for receiver/transmitter mounts to address corrosion and environmentally induced damage related issues with the equipment.

Interviews with NATEC representatives revealed the following data:

Findings:

1. Currently, there is no platform specific training provided to the technical representatives (i.e., they are currently learning by "word of mouth" from the most knowledgeable NATEC rep).
2. There is a serious lack of training support (i.e., not enough funding or factory training).
3. Factory training is generally only given at the "I"-level.
4. AN/ARC-210 is lacking "up-front" training (i.e., training comes prior to fielding/installation if at all).
5. NATEC representatives are too heavily dependent upon both maintenance and operator training with the operation and loading of the equipment.
6. Pilot's did receive HAVEQUICK training before they were required to use it, resulting in duplication of efforts (i.e., pilots are being trained twice by representatives).
7. The CH-46 FREST is not being taught how to load the system with the CYZ-10 component.
8. The CH-46 and H-1 have the same CDNU component but have different procedures to do similar functions.

Recommendations:

1. Provide platform specific factory training to all NATEC representatives.
2. Provide up front training support and materials for the AN/ARC-210 system (i.e., factory training to NATEC representatives and squadron personnel prior to system utilization by fleet).
3. Provide factory training to the squadrons at the "O" level.
4. Provide the CH-46 FREST with the CYZ-10/DTD component.

Throughout the second data collection effort at NAS Lemoore, NAS North Island, MCAS Miramar, and MCAS Camp Pendleton interviews were conducted with operator and maintenance personnel representatives. Operator personnel included pilots, and instructor pilots. The maintenance personnel included Avionics Technicians (AT's), NAMTRAGRUDET/FREST Instructors, and NATEC representatives. Throughout the data collection process the following squadrons were interviewed and surveyed: VFA-22, VFA-94, VFA-113, VFA-125, VMAT-101,VMFA-225, VMFA-314, HMM-161, HMM-163, HMM-166, HMH-361, HMH-462, HMH-466, MALS 39, HMM-364, HMLA-367, HMLA-369, HMLA-267, HMMT-164, HMT-303 FREST and F-18 NAMTRAGRUDET. During the data gathering process a total of 121 operator and maintenance personnel were interviewed. The following is a summation of the data obtained during the subject interviews:

NAS LEMOORE

F/A-18C/D COMMUNITY

Findings:

Technical Publication Issues

1. The following list of source data books adequately cover AN/ARC-210 CYZ-10/DTD/Data Transfer Device (DTD) loading/merging/transferring procedures but are not currently available to all squadrons:
    - Boeing Operation of the F/A-18C/D Avionics Subsystem for Aircraft with the 13C System Configuration Set MDCB1984-13C Software Set (Grey Book/July 1998)
    - Software User's Guide for the AN/ARC-210 Fill Program (AFP) V2.0(JSC-CR-97-008)
    - AN/ARC-210 (V) EP Radio User's Logistics Support Summary (AV-ULSS-410)
    - Operation of the F/A-18C/D Avionics Subsystem for Aircraft with the 13C System Configuration Set (MOC B1984-13C)
    - O-Level Source Data for Generating and Loading AN/ARC-210 Fill Data (NAWCADI-415243-323130)
    - Talk II SINCGARS Multi-service Communications Procedures for the Single-Channel Ground and Airborne Radio System
    - Draft Navy Revised Battlefield Electronic Communications Electronics Operating Instructions System Concept of Operations (RBECS)/Naval Command, Control and Ocean Surveillance Center In-Service Engineering (NISE East)
    - Rockwell Collins International Avionics and Communication Division Product Information
    - US Army Aviation Center (Fort Rucker, Alabama) April 1991 Advanced Sheet Single Channel Ground/Airborne Radio System (SINCGARS) in support of 4G-2159-6
2. Maintenance technicians stated that they are having difficulty "loading/merging the cryptographic data into the Data Transfer Device (CYZ-10/DTD)", this difficulty is resulting in the operator's inability to communicate with other squadrons, commands, and platforms (current procedures are not covered in the technical publications).
3. Maintenance technicians stated that "operators are having difficulty using the data loads and initializing the system in HAVEQUICK modes", current publications do not cover the various modes in adequate detail.
4. Maintenance personnel stated that "troubleshooting the CYZ-10/DTD is difficult due to a lack of detailed procedures/inadequate publications".
5. Operator personnel did not receive any documentation on the system, squadron personnel are creating their own checklists and job aides in lieu of official documentation.
6. According to maintenance technicians "technical publications are current but are seldom utilized for troubleshooting procedures".
7. The technical publications do not contain information regarding CYZ-10/DTD.

Training Issues

1. Both operator and maintenance personnel stated that they "did not receive enough in-depth training on the system in the various modes" (i.e., HAVEQUICK), currently the squadron personnel are learning by "word of mouth", "trial and error" and "on the job training".
2. In depth On the Job Training (OJT) is being provided by Naval Aviation Technical Engineering Command (NATEC) representatives, these representatives have been creating their own checklists and are currently the only information sharing source with this information and other relevant source data that are being provided to maintenance personnel.
3. Operator personnel are not receiving supplemental training, and formal training on the system is vague (i.e., curriculum only covers menu screen navigation, nothing on the in-depth functionality of the various modes).
4. Maintenance personnel stated that "troubleshooting is difficult due to load problems with the CYZ-10/DTD as a result of lack of training".
5. Operator personnel are relying on "word of mouth" and "trial and error" (i.e., information sharing from senior operators).
6. Maintenance personnel are "double loading" the DTD and not properly merging the data (i.e., double loading is resulting in the operator's inability to communicate with other platforms, and squadrons).
7. The AN/ARC-210 Fill Program (AFP) is an excellent DOS-based software program but needs to be modified, currently the program is not IT-21/Windows NT compliant (i.e., program must be booted off of the disc and certain squadrons are not aware of this "work around").
8. NATEC representatives received very high level training from Boeing, but no training was provided by Rockwell Collins on the actual system itself.
9. Classified Material System (CMS) is only providing certain squadrons with one DTD instead of the two devices they are supposed to receive (requires further research, maybe a low supply/logistics issue). Additionally, NAMTRAGRUDET Lemoore is not being provided with a CYZ-10/DTD.
10. NATEC representatives no longer have access to a DTD to utilize for hands-on training.
11. Not all squadrons have access to platform specific ICW developed for PMA209 by DCS, and those that do are not utilizing this resource (i.e., current staffing does not allow for refresher training on the system).
12. Instructors stated that "the current training curriculum does not include functional and in-depth information for maintenance as well as operation of the system".
13. Current training curriculum does not include information on the DTD.
14. Training curriculum does not cover sub menu displays in detail and only covers main menu displays/menu navigation.
15. Simulated Aircraft Maintenance Trainer (SAMT) is available at the NAMTRAGRUDET but is outdated and does not include loading/fault insertion with the system (NAMTRAGRUDET Lemoore naval message 211425Z-JUN-99 refers to this issue).
16. NAMTRAGRU DET has an electronic classroom facility, however instructors stated that "current computer aided instruction is vague and needs to be modified to include in-depth functional training".
17. NAMTRAGRU DET has a learning resource facility but according to the instructors "the resource is seldom utilized", the location is inconvenient for daily use.

While both areas are onboard NAS Lemoore, the squadrons are located about seven miles from the NAMGRAGRUDET location.

System Design Issues

1. All platforms, HAVEQUICK training nets are not hard wired into the system. There is an approved table of training net frequencies; however the specific order of loading each one seems to be an uncontrolled variable (i.e., order of load must match between radios or no HAVEQUICK communication is possible).
2. F-18 only, the J5 connector on COM 1 connector is difficult to manipulate/remove and replace (i.e., connects at a 90degree angle which places strain on the cable attached to it due to its proximity to other fixed-in-place cables immediately to the right/forward of the J5 cable). Per August 99 AN/ARC-210 ILSMT – Lot 10/11/F-18 aircraft by AFC 184 Part II will have this problem resolved.

Recommendations:

Technical Publication

1. Provide relevant documentation to all squadron personnel (i.e., standardized work packages need to be developed and provided).
2. Provide source data books to all squadron personnel (i.e., data transfer loading/merging/transferring procedures). The end user should not have to seek out data on new/modified systems.
3. Modify official publications to include detailed troubleshooting procedures and CYZ-10/DTD source data.

Training

1. Provide squadron personnel with in-depth training on the system in the various modes (i.e., HAVEQUICK), currently the squadron personnel are learning by "word of mouth", "trial and error", and "on the job training". HAVEQUICK can be reinforced with on-the-job training; SINCGARS has no equivalent training mode to reinforce theory of operation. HAVEQUICK training load data requires detailed planning, coordination, and execution between all involved aviation units. SINCGARS load data originates from the "ground-side" of the Marines/Army and requires detailed planning, coordination, and execution between the various service branches.
2. Provide squadron personnel with all relevant source data and training guides.
3. Provide supplemental training on the system, formal training on the system is vague (i.e., curriculum only covers menu screen navigation, nothing on the in-depth functionality of the various modes). Training curriculum should also be modified to meet the fleet's needs.
4. Provide more hands-on training with the system, "troubleshooting is difficult due to load problems as a result of lack of documentation to train from".
5. Establish a formal information sharing capability (i.e., standardized work packages) for squadron personnel and between platforms for the required data not contained in official

technical publications, they are currently relying on "word of mouth" and "trial and error" (i.e., information sharing from senior operators).

6. Modify AN/ARC-210 Fill Program (AFP) DOS based software program, currently the program is not IT-21/Windows NT compliant (i.e., the program needs to be booted off of a floppy and not all squadrons are aware of this "work around").
7. Provide squadron with the PMA-209/DCS Corporation platform specific ICW. Any CD-ROM computer hardware requirements must be resolved as well.
8. Modify current training curriculum to include more functional and in-depth for maintenance as well as operation of the system (i.e., CYZ-10/DTD needs to be incorporated into the lesson plan and one assigned to NAMTRAGRUDET Lemoore).
9. Modify training curriculum to cover sub menu displays in greater detail.
10. Modify SAMT to include loading/fault occurrences with the system.
11. Modify computer-aided instruction, current courseware being utilized within the NAMTRAGRUDET Electronic Classroom (ECR) is vague and should be modified to include more detailed functionality of the system.

System Design

1. Replace the 90 degree connector on J5 with a zero degree or straight connector. Expedite approval /incorporation of AFC 184 Part II.

MCAS MIRAMAR

F-A18 C/D COMMUNITY

Findings:

Technical Publication Issues

1. The following list of source data books adequately cover AN/ARC-210 CYZ-10/DTD/Data Transfer Device (DTD) loading/merging/transferring procedures but are not currently available to all squadrons:
   - Boeing Operation of the F/A-18C/D Avionics Subsystem for Aircraft with the 13C System Configuration Set MDCB1984-13C Software Set (Grey Book/July 1998)
   - Software User's Guide for the AN/ARC-210 Fill Program (AFP) V2.0(JSC-CR-97-008)
   - AN/ARC-210 (V) EP Radio User's Logistics Support Summary (AV-ULSS-410)
   - Operation of the F/A-18C/D Avionics Subsystem for Aircraft with the 13C System Configuration Set (MOC B1984-13C)
   - O-Level Source Data for Generating and Loading AN/ARC-210 Fill Data (NAWCADI-415243-323130)
   - Talk II SINCGARS Multi-service Communications Procedures for the Single-Channel Ground and Airborne Radio System

- Draft Navy Revised Battlefield Electronic Communications Electronics Operating Instructions System Concept of Operations (RBECS)/Naval Command, Control and Ocean Surveillance Center In-Service Engineering (NISE East)
- Rockwell Collins International Avionics and Communication Division Product Information
- US Army Aviation Center (Fort Rucker, Alabama) April 1991 Advanced Sheet Single Channel Ground/Airborne Radio System (SINCGARS) in support of 4G-2159-6

2. Maintenance technicians stated that they originally had difficulty "loading/merging the cryptographic data into the Data Transfer Device (CYZ-10/DTD)", this difficulty was resulting in the operator's inability to communicate with other squadrons, commands, and platforms, current procedures are located in obscure sections (i.e., Illustrated Parts Breakdown Section/IPB) of the technical publications.
3. Maintenance technicians stated that "operators are having difficulty using the data loads and initializing the system in HAVEQUICK modes".
4. Maintenance personnel stated that originally "troubleshooting the CYZ-10/DTD was difficult due to the obscure organization of the technical publications".
5. Squadron personnel did not receive any documentation with the AN/ARC-210 and CYZ-10/DTD systems, they created their own checklists and job aides in lieu of official documentation.
6. According to maintenance technicians "technical publications are current but are seldom utilized for troubleshooting procedures", squadron personnel are relying on "word of mouth and OJT".
7. Maintenance personnel stated that " they experienced difficulty identifying address numbers (i.e., COM1/COM2) and eventually discovered the information by accident and were later found in a flow chart within the technical publications).

Training Issues

1. Both operator and maintenance personnel stated that they "did not receive enough in-depth training on the system in the various modes" (i.e., HAVEQUICK and SINCGARS), currently the squadron personnel are learning by "word of mouth", "trial and error" and "on the job training".
2. Operator personnel are not receiving any supplemental training, and formal training on the system is vague (i.e., no training is being provided on the in-depth functionality of the various modes), as a result the squadron personnel are not operating the system's to it's fullest capabilities (i.e., they are currently not utilizing the SINCGARS mode).
3. Squadron personnel stated that "they only received differences training on the ARC-182 and AN/ARC-210, this training was too high level and only covered the capabilities of the new system".
4. AN/ARC-210 Fill Program (AFP) is an excellent DOS-based software program but needs to be modified, currently the program is not Windows NT compliant (i.e., squadrons are only able to access by booting program off of a floppy and not all platforms are aware of this "work around").
5. Not all squadrons have access to the PMA-209/DCS Corporation platform specific ICW, and those that do are not utilizing this resource (i.e., current staffing does not allow for refresher training on the system).

6. Squadron personnel communicated the need for in-depth theory of operation and system functionality training on the AN/ARC-210 (i.e., currently squadron personnel are relying on "OJT").
7. Squadron personnel communicated the need for system interface training (i.e., system goes down intermittently for no apparent reason and they are unable to detect potential "bleedover" problems with corresponding systems).
8. VMFAT-101 just received CYZ-10/DTD and needs training on the component.

Maintenance Issues

1. Maintenance technicians are experiencing corrosion problems (i.e., high torque screws are corroding, need Phillips screws instead) with the antennas.
2. Squadron personnel stated the need for lithium 9-volt batteries (regular 9-volt batteries only last for 2 hours at a time).

System Design Issues

1. Operator personnel are experiencing frequency and "bleed over" problems in Single Channel (SC) normal mode below 5,000 ft. and 3-5 miles from the hanger, operators are detecting commercial frequencies and are unable to communicate in normal mode.
2. Operator personnel in the squadrons stated that they are "experiencing frequency problems" (i.e., only works in close proximity/10 nautical miles when operating in the SINCGARS mode).
3. Operator personnel (F/A-18/D) stated that "the system was not capable of transmitting and receiving at the same time/COM1 or COM2).
4. Maintenance personnel stated that they were unable to utilize the Cryptographic Ignition Key (CIK) in the supervisor mode (personnel should be able to utilize in both user and supervisor mode).

Recommendations:

Technical Publication

1. Provide all relevant documentation to squadron personnel (i.e., standardized work packages need to be developed and provided).
2. Modify technical publications to include better organized information regarding loading/merging the cryptographic data into the Data Transfer Device (CYZ-10/DTD) is located in obscure sections (i.e., information is currently located in the illustrated Parts Breakdown Section/IPB of the publications).

Training

1. Provide in-depth training on the system in the various modes" (i.e., HAVEQUICK and SINCGARS), currently the squadron personnel are learning by "word of mouth", "trial and error" and "on the job training" and only received "differences training on the system".

2. Provide squadron personnel with supplemental training (i.e., no training is being provided on the in-depth functionality of the various modes), as a result the squadron personnel are not operating the system to it's fullest capabilities (i.e., they are currently not utilizing the SINCGARS mode).
3. Modify the AN/ARC-210 Fill Program (AFP), DOS-based software, currently the program is not IT-21/Windows NT compliant (i.e., squadrons are only able to access program when booting the software of the floppy and not all platforms are aware of the "work around").
4. Provide all squadrons with PMA-209/DCS Corporation platform specific ICW.
5. Provide all squadron personnel with in-depth theory of operation, system interface and functionality/hands-on training with the AN/ARC-210.

Maintenance

1. Investigate ways to prevent corrosion problems with antennas.
2. Modify publications to require lithium 9 volt batteries, regular 9-volt batteries (regular batteries are losing power after 2 hours).

System Design

1. Examine frequency problems with the system, operator personnel are experiencing frequency and "bleed over" problems in Single Channel (SC) mode below 5,000 ft. and 3-5 miles from the hanger (i.e., operators are detecting commercial frequencies and are unable to communicate in normal mode).
2. Examine frequency problems with the EP modes, operator personnel in the squadrons that are utilizing SINCGARS mode stated that they are "experiencing frequency problems" (i.e., only works in close proximity/10 nautical miles).
3. Examine receiver/transmitter functions, operator personnel (F/A-18/D) stated that "the system was not capable of transmitting and receiving at the same time/COM1 or COM2)".
4. Inspect the Cryptographic Ignition Key (CIK) to determine why the CIK can only be utilized in the supervisor mode.

CH-46E COMMUNITY

Findings:

Technical Publication Issues

1. The following list of source data books adequately cover AN/ARC-210 CYZ-10/DTD/Data Transfer Device (DTD) loading/merging/transferring procedures but are not currently available to all squadrons:
   - AN/ARC-210 (V) EP Radio User's Logistics Support Summary (AV-ULSS-410)
   - O-Level Source Data for Generating and Loading AN/ARC-210 Fill Data (NAWCADI-415243-323130)
   - Talk II SINCGARS Multi-service Communications Procedures for the Single-Channel Ground and Airborne Radio System

- Draft Navy Revised Battlefield Electronic Communications Electronics Operating Instructions System Concept of Operations (RBECS)/Naval Command, Control and Ocean Surveillance Center In-Service Engineering (NISE East)
- Rockwell Collins International Avionics and Communication Division Product Information
- US Army Aviation Center (Fort Rucker, Alabama) April 1991 Advanced Sheet Single Channel Ground/Airborne Radio System (SINCGARS) in support of 4G-2159-6

4. Squadron personnel stated that "the technical publications are inadequate, they offer no real advantage over what a technician can learn by just working with the systems and running BIT Tests".
5. Maintenance technicians stated that "technical publications also lack detailed flow charts and schematics for troubleshooting".
6. According to squadron personnel, the technical publications are not "user friendly" and seldom utilized.
7. Operators and maintainers are creating their own checklists and training guides to compensate for insufficient publications and manuals.
8. Maintenance personnel stated that "the technical publications do not cover loading procedures on the SINCGARS mode".

Training Issues

1. Little to no formal training has been provided to operator and maintenance personnel.
2. There is no formal information sharing capability, operator and maintenance personnel are relying on "trial and error", "word of mouth" and "local mentoring system" to learn the system functionality.
3. Operator and maintenance personnel stated that "they are not receiving enough technical/ hands-on training with the system".
4. Operators stated that "there is not enough system functionality training on the advanced aspects of the radio", currently they are not operating the system to its fullest capabilities and they are just starting to load electronic protection modes.
5. Squadrons have non-platform specific courseware (AN/ARC-210 (V) Radio Interactive Training System (ITS) developed for PMA209), but they are not fully utilizing this capability.
6. Due to staffing/manning problems training time is limited, personnel have little to no training on the system.
7. Little to no information sharing is occurring within squadrons (i.e., certain squadron personnel were not aware of available computer-based training courseware).

Recommendations:

Technical Publication

1. Provide all relevant documentation to squadron personnel (i.e., standardized work packages need to be developed and provided).

2. Review and modify technical publications to include more detailed flow charts and schematics for troubleshooting.
3. Modify and re-organize technical publications into a "user friendly" layout (i.e., currently pubs are not organized in a format that is easy to utilize so the squadron personnel avoid utilizing this resource).
4. Revise the technical publications to include the specific loading procedures on the SINCGARS mode of the system.

Training

1. Provide in-depth formal training to operator and maintenance personnel on the advanced aspects of the radio, (i.e., currently they are not operating the system to its fullest capabilities and are just starting to load electronic protection modes/HAVEQUICK and SINCGARS).
2. Establish a formalized information sharing capability (i.e., standardized work packages), squadron personnel are currently relying on "trial and error", "word of mouth" and "local mentoring system" to learn the system functionality ("corporate knowledge" is often lost through deployment rotations).
3. Provide squadron personnel with more detailed technical training and hands-on training with the system.
4. Provide and fully utilize the non-platform specific courseware (AN/ARC-210 (V) Radio Interactive Training System (ITS) developed for PMA209).

CH-53E COMMUNITY

Findings:

Technical Publication Issues

1. The following list of source data books adequately cover AN/ARC-210 CYZ-10/DTD/Data Transfer Device (DTD) loading/merging/transferring procedures but are not currently available to all squadrons:
   - AN/ARC-210 (V) EP Radio User's Logistics Support Summary (AV-ULSS-410)
   - O-Level Source Data for Generating and Loading AN/ARC-210 Fill Data (NAWCADI-415243-323130)
   - Talk II SINCGARS Multi-service Communications Procedures for the Single-Channel Ground and Airborne Radio System
   - Draft Navy Revised Battlefield Electronic Communications Electronics Operating Instructions System Concept of Operations (RBECS)/Naval Command, Control and Ocean Surveillance Center In-Service Engineering (NISE East)
   - Rockwell Collins International Avionics and Communication Division Product Information
   - US Army Aviation Center (Fort Rucker, Alabama) April 1991 Advanced Sheet Single Channel Ground/Airborne Radio System (SINCGARS) in support of 4G-2159-6
2. Squadron personnel received the system first and had to develop their own documentation material from the other squadrons in lieu of official documentation.

3. Squadron personnel stated that “technical publications are inadequate, they lack detailed troubleshooting/fault isolation, component location, and system functionality information”.
4. Maintenance technicians stated that “technical publications lack detailed flow charts, schematics, and wiring diagrams for troubleshooting”.
5. Operator’s stated that they utilize the Rockwell Advanced Communication Booklet for “NATOPS-like knee pad guidance”.
6. Operator personnel stated that “the NATOPS checklist needs more detailed information regarding system operation”.

Training Issues

1. Little to no training has been provided to squadron personnel.
2. Currently there is no formal information sharing capability to learn advanced aspects of the system, operator and maintenance personnel are relying on “trial and error” and “word of mouth” to learn the system (i.e., certain squadrons are not utilizing the HAVEQUICK mode).
3. Operator and maintenance personnel stated that they “have not been provided with enough technical/hands-on training with the system (i.e., component locations, system functionality and circuit analysis descriptions)”.
4. Due to staffing/manning problems training time is limited, personnel have little to no training on the system (i.e., personnel need more in-depth, hands-on training on the load/fill procedures with the CYZ-10/DTD).
5. Little to no information sharing is occurring within squadrons (i.e., some squadron maintenance and operator personnel did not know of available platform specific computer-based training courseware resources).

System Design Issues

1. Radio range is limited and radio ICS volume is inconsistent with other radios on the aircraft (i.e., AN/ARC-210 volumes are not as loud).
2. Operator personnel stated that “the scan frequency is good, but after keying the microphone to speak on a scanned frequency, the system does not continue to scan, it remains on the last frequency utilized”.

Recommendations:

Technical Publication

1. Provide all relevant documentation to squadron personnel (i.e., standardized work packages need to be developed and provided).
2. Review and modify technical publications to include: detailed troubleshooting/fault isolation, component location, and system functionality information.
3. Modify the NATOPS checklist to include more detailed information regarding system operation.

Training

1. Provide more in-depth formal hands-on training to squadron personnel on the advanced aspects of the system, operator and maintenance personnel are relying on "trial and error" and "word of mouth" to learn the system (i.e., certain squadrons are not utilizing the HAVEQUICK mode).
2. Provide PMA-209/DCS Corporation computer-based training CD ROM to all squadrons.

MCAS CAMP PENDLETON

AH-1W COMMUNITY

Findings:

Technical Publication Issues

1. The following list of source data books adequately cover AN/ARC-210 CYZ-10/DTD/Data Transfer Device (DTD) loading/merging/transferring procedures but are not currently available to all squadrons:
   - AN/ARC-210 (V) EP Radio User's Logistics Support Summary (AV-ULSS-410)
   - O-Level Source Data for Generating and Loading AN/ARC-210 Fill Data (NAWCADI-415243-323130)
   - Talk II SINCGARS Multi-service Communications Procedures for the Single-Channel Ground and Airborne Radio System
   - Draft Navy Revised Battlefield Electronic Communications Electronics Operating Instructions System Concept of Operations (RBECS)/Naval Command, Control and Ocean Surveillance Center In-Service Engineering (NISE East)
   - Rockwell Collins International Avionics and Communication Division Product Information
   - US Army Aviation Center (Fort Rucker, Alabama) April 1991 Advanced Sheet Single Channel Ground/Airborne Radio System (SINCGARS) in support of 4G-2159-6
2. Maintenance technicians communicated the need to modify the publications to provide more detailed flow charts and schematics (squadrons are currently relying on NATEC representatives to provide this information).
3. Operators and maintainers are creating their own checklists and training guides to compensate for insufficient publications and manuals.
4. The NATOPS manual is currently being updated and has yet to be provided to squadrons.
5. The BellTectron helicopter manufacturer's manual was provided to operators and has been utilized for basic system understanding but contains too great a level of detail for efficient utilization at the squadron level."
6. The NATOPS and technical publications do not provide a detailed explanation of platform specific scanlist functions and operation (i.e., operator's are developing and relying on their own checklists for this information).

7. Squadron personnel stated that “published loading procedures for electronic protection and logic converter modes are too vague and unreliable”.

Training Issues

1. In-depth formal training is now being provided but was not available during the initial integration/installation phases of the system.
2. Squadron personnel are not receiving enough technical/hands-on training with the system.
3. Training squadrons do not have modified simulators that include current systems (current simulator is outdated and only contains the ARC-182 radio).
4. Operators are not receiving system functionality training and adequate documentation on the advanced aspects of the radio, currently they are not operating the system to its fullest capabilities (i.e., SINCGARS mode).
5. Maintenance personnel need more in-depth training on the advanced aspects of the system (i.e., currently operators are experiencing problems due to incorrect load/fill data).
6. Operator personnel stated that “there is a dissemination of information problem regarding the knowledge of SATCOM frequencies/ranges”).
7. Squadron personnel stated that “they need more NATEC assistance with the system”.
8. NATEC stated that “adequate training and relevant documentation is available upon request, but not utilized by squadron personnel”.

System Design Issues

1. Location of Logic Converter (CV) is difficult to access (i.e., not clearly marked in the aircraft).
2. Squadrons do not have load cable for electronic protection modes (i.e., loading from DTD to A/C).
3. AH-1W has very complex wiring components and is difficult to operate and maintain (i.e., publications contain vague schematics and wiring diagrams).
4. Operator and maintenance personnel are experiencing “bleed over” with the IFF system because both systems utilize the same antenna.
5. Operator personnel communicated the need for more available SATCOM frequencies (i.e., currently there are not enough SATCOM frequencies available to them).
6. Operator personnel stated that “the keypad/display shows previous frequency information, not current frequency information).

Recommendations:

Technical Publication

1. Provide all relevant documentation to squadron personnel (i.e., standardized work packages should be developed and provided).
2. Modify publications to include more detailed troubleshooting/fault isolation, component location and system functionality information.

3. Modify publications to include more detailed flow charts and schematics (squadrons are currently relying on NATEC representatives to provide this information).
4. Provide standardized operator and maintenance checklists/job aides and training guides (currently, pilots and maintainers are developing their own) to promote information sharing within the squadrons.
5. Modify the manufacturer's manual to explain platform specific scan list functions and operations.
6. Provide published loading procedures for electronic protection and logic converter modes.

Training

1. Provide more formal and hands-on training to the squadrons (both operator and maintenance personnel).
2. Establish a formal information sharing capability (i.e., standardized work packages) to learn advanced aspects of the system, currently the operator and maintenance personnel are relying entirely on "trial and error" and "word of mouth" to learn the system (currently there is a serious information dissemination and training integration problem).
3. Modify training simulators to include the current systems (simulators are outdated and contain the ARC-182 radio).
4. Provide squadron personnel with detailed system functionality training on the advanced aspects of the radio, currently they are not operating the system to its fullest capabilities.
5. Provide platform specific computer-based training to the squadrons for refresher training on the system.

CH-46E COMMUNITY

Findings:

Technical Publication Issues

1. The following list of source data books adequately cover AN/ARC-210 CYZ-10/DTD/Data Transfer Device (DTD) loading/merging/transferring procedures but are not currently available to all squadrons:
   - AN/ARC-210 (V) EP Radio User's Logistics Support Summary (AV-ULSS-410)
   - O-Level Source Data for Generating and Loading AN/ARC-210 Fill Data (NAWCADI-415243-323130)
   - Talk II SINCGARS Multi-service Communications Procedures for the Single-Channel Ground and Airborne Radio System
   - Draft Navy Revised Battlefield Electronic Communications Electronics Operating Instructions System Concept of Operations (RBECS)/Naval Command, Control and Ocean Surveillance Center In-Service Engineering (NISE East)
   - Rockwell Collins International Avionics and Communication Division Product Information
   - US Army Aviation Center (Fort Rucker, Alabama) April 1991 Advanced Sheet Single Channel Ground/Airborne Radio System (SINCGARS) in support of 4G-2159-6

2. Squadron personnel stated that “the technical publications are inadequate, they offer no real advantage over what a technician can learn by just working with the systems and running BIT Tests”.
3. Maintenance technicians stated that “technical publications lack detailed flow charts and schematics for troubleshooting” (i.e., current publications/A1-H46AE-600-100 only includes removal and replacement procedures which does not pinpoint fault isolation/troubleshooting problems).
4. According to squadron personnel, the technical publications are not “user friendly” and “seldom utilized”
5. Operators and maintainers are creating their own checklists and training guides to compensate for insufficient publications and manuals.
6. NATOPS manual has been modified, but contains inconsistent cross-referencing data (i.e., A1-H46AE-NFM-000 dated 15 July 96 contains a lot of good information. However, Part I Chapter 2 only mentions the ARC-182 system and finally mentions the AN/ARC-210 system in Part VII Chapter 14. There is no “cross referencing information within the manual”).
7. Certain operator personnel were not aware that the NATOPS manual was available within their squadron (verify that the existing NATOPS distribution process is adequate and includes provisions for each aircrew member to have their own copy.

Training Issues

1. Little to no formal training has been provided to operation and maintenance squadrons.
2. There is no formal information sharing capability, operator and maintenance personnel are relying on “trial and error”, “word of mouth” and “local mentoring system” to learn the system functionality (i.e., certain squadron personnel did not know of available computer-based training courseware resources).
3. Operator and maintenance personnel stated that “they are not receiving enough technical training/hands-on training with the system”.
4. Operators stated that “there is not enough system functionality training on the advanced aspects of the radio”, currently they are not operating the system to its fullest capabilities and they are just starting to load electronic protection modes (i.e., not operating in classified or HAVEQUICK/SINCGARS modes).
5. Squadrons have non-platform specific courseware (AN/ARC-210 (V) Radio Interactive Training System (ITS) developed for PMA209), but they are not fully utilizing this capability.
6. Due to staffing/manning problems training time is limited, personnel have little to no training time on the system.
7. Squadron personnel stated that “they need more NATEC assistance with the system”.

Recommendations:

Technical Publication

1. Provide all relevant documentation to squadron personnel (i.e., standardized work packages should be developed and provided).

2. Provide official publication, unofficial source data adequately covers the AN/ARC-210, however the information should be integrated into the official documentation (i.e., squadrons are creating their own checklists and documentation in lieu of the official documentation).
3. Review and modify technical publications to include more detailed flow charts and schematics for troubleshooting.
4. Re-organize and modify technical publications into a "user friendly" layout.
5. Revise technical publications to include the specific loading procedures on the HAVEQUICK/SINCGARS modes of the system.
6. Hold formal NATOPS review to address/resolve attempted duplication between Part I Chapter 2 and Part VII Chapter 14.

Training

1. Provide in-depth formal training to operator and maintenance personnel on the advanced aspects of the radio, currently they are not operating the system to its fullest capabilities and they are just starting to load electronic protection modes.
2. Establish a formal information sharing capability (i.e., standardized work packages), squadron personnel are relying on "trial and error", "word of mouth" and "local mentoring system" to learn the system functionality.
3. Provide detailed technical and hands-on training to squadron personnel.
4. Utilize the non-platform specific courseware (AN/ARC-210 (V) Radio Interactive Training System (ITS) developed by DCS Corporation for PMA209) within the squadrons.

UH-1N COMMUNITY

Findings:

Technical Publication Issues

1. The following list of source data books adequately cover AN/ARC-210 CYZ-10/DTD/Data Transfer Device (DTD) loading/merging/transferring procedures but are not currently available to all squadrons:
   - UH-1N Control Display Navigation Unit Training Course (CDNU) Operator Training Brief at New River, Camp Pendleton, and Atlanta (17-19 Oct. 95 and 3-7 June 96)
   - Preliminary Air Subsystems Op's Manual (SOM) for the UH-1N Avionics Control System (ACS) A.2 Revision 2
   - AN/ARC-210 (V) EP Radio User's Logistics Support Summary (AV-ULSS-410)
   - O-Level Source Data for Generating and Loading AN/ARC-210 Fill Data (NAWCADI-415243-323130)
   - Talk II SINCGARS Multi-service Communications Procedures for the Single-Channel Ground and Airborne Radio System
   - Draft Navy Revised Battlefield Electronic Communications Electronics Operating Instructions System Concept of Operations (RBECS)/Naval Command, Control and Ocean Surveillance Center In-Service Engineering (NISE East)

- Rockwell Collins International Avionics and Communication Division Product Information
- US Army Aviation Center (Fort Rucker, Alabama) April 1991 Advanced Sheet Single Channel Ground/Airborne Radio System (SINCGARS) in support of 4G-2159-6

2. Squadron personnel stated that "current technical publications are inadequate (i.e., vague and outdated) and lack detailed troubleshooting/fault isolation, component location and system functionality information".
3. Operators and maintainers are creating their own checklists and training guides to compensate for insufficient publications and manuals.
4. The NATOPS manual has not been distributed to the squadrons, operator's are currently using the Air Subsystems Operator's manual (July 97) for system data.
5. The BellTectron helicopter manufacturer's manual was provided and has been utilized for basic system understanding but is too complicated to fully utilized.
6. Squadrons are lacking standardized work packages.

Training Issues

1. In-depth formal training is now being provided, but was not available during the initial integration/installation phases of the system.
2. Currently, there is no formal information sharing capability to learn advanced aspects of the system, operator and maintenance personnel are relying entirely on "trial and error" and "word of mouth" to learn the system.
3. Operators are not receiving system functionality training and adequate documentation on the advanced aspects of the radio; currently they are not operating the system to its fullest capabilities (i.e., SINCGARS mode).
4. Maintenance personnel need more in-depth training on the advanced aspects of the system (i.e., currently operator's are experiencing problems due to incorrect load/fill data).
5. Operator personnel stated that "there is a dissemination of information problem regarding the knowledge of SATCOM frequencies/ranges").
6. Squadron personnel stated that "they need more NATEC assistance with the system".
7. NATEC stated that " adequate documentation and training is available upon request, but has not been utilized".

System Design Issues

1. Location of Logic Converter (CV) is difficult to access.
2. Squadrons do not have load cable for electronic protection modes (i.e., loading from DTD to A/C).
3. Operator and maintenance personnel are experiencing "bleed over" with the IFF system.
4. Operator personnel stated that "the backslash key doesn't work properly and creates an unnecessary time consuming process of having to access the index page and go through several pages to initialize all three radios".
5. Operator personnel communicated the need for more available SATCOM frequencies (i.e., currently there are not enough SATCOM frequencies available to them).
6. Operator personnel stated that "the single channel frequency mode is currently experiencing local bleed over with cellular phone conversations when in close proximity to the hanger".

Recommendations:

Technical Publication

1. Provide all relevant documentation to squadron personnel (i.e., standardized work packages should be developed and provided).
2. Modify and provide official publications to include more detailed troubleshooting/fault isolation, component location and system functionality information.
3. Modify official publications to include more detailed flow charts and schematics (squadrons are currently relying on NATEC representatives to provide this information).
4. Provide standardized operator and maintenance checklists/job aides and training guides (currently, pilots and maintainers are developing their own) to promote information sharing within the squadrons.
5. Provide detailed loading procedures for electronic protection and logic converter modes.

Training

1. Provide more formal and hands-on training to operator and maintenance personnel.
2. Establish an information sharing capability (i.e., standardized work packages) to teach advanced aspects of the system, operator and maintenance personnel are relying on "trial and error" and "word of mouth" to learn the system.
3. Modify training simulators to include current systems (current simulator is outdated).
4. Provide detailed system functionality training on the advanced aspects of the radio; currently they are not operating the system to its fullest capabilities.
5. Modify the Technical training syllabus to include AN/ARC-210 system.
6. Provide computer-based training to all of the squadrons for re-fresher training (currently squadrons have adequate hardware but are missing platform and non-platform specific courseware).

Recommendations:

Further investigate potential solutions to the following System Design Issues:

System Design Issues

1. Location of Logic Converter (CV) is difficult to access.
2. Squadrons do not have load cable for electronic protection modes (i.e., loading from DTD to A/C).
3. Operator and maintenance personnel are experiencing "bleed over" with the IFF system.
4. Operator personnel stated that "the backslash key doesn't work properly and creates an unnecessary time consuming process of having to access the index page and go through several pages to initialize all three radios".
5. Operator personnel communicated the need for more available SATCOM frequencies (i.e., currently there are not enough SATCOM frequencies available to them).

6. Operator personnel stated that "the single channel frequency mode is currently experiencing local bleed over with cellular phone conversations when in close proximity to the hanger".

(Further investigation required)

NAS OCEANA

F/A-18 COMMUNITY

Findings:

Technical Publication Issues

1. The following list of source data adequately covers AN/ARC-210 CYZ-10/DTD/Data Transfer Device (DTD) loading/merging/transferring procedures but are not currently available to all squadrons:
   - Software User's Guide for the AN/ARC-210 Fill Program (AFP) V2.0 (JSC-CR-97-008)
   - AN/ARC-210 (V) EP Radio User's Logistics Support Summary (AV-ULSS-410)
   - Operation of the F/A-18C/D Avionics Subsystem for Aircraft with the 13C System Configuration Set (MOC B1984-13C) [Grey Book]
   - O-Level Source Data for Generating and Loading AN/ARC-210 Fill Data (NAWCADI-415243-323130)
   - Rockwell Collins International Avionics and Communication Division Product Information
2. Maintenance technicians stated that they are having difficulty "loading/merging the cryptographic data into the Data Transfer Device (CYZ-10/DTD)", this difficulty is resulting in the operator's inability to communicate with other squadrons, commands, and platforms (current procedures are not covered in the technical publications).
3. Operator personnel stated that "they are having difficulty using the data loads and initializing the system in HAVEQUICK modes", current publications do not cover the various modes in adequate detail. As a result, squadron personnel are creating their own checklists and job aides in lieu of official documentation.
4. Maintenance personnel stated that "troubleshooting the CYZ-10/DTD is difficult due to: lack of detailed procedures, inadequate publications, and little to no training on the advanced capabilities of the system".
5. According to maintenance technicians "technical publications are current but are seldom utilized for troubleshooting procedures" (i.e., they are not "user friendly" and do not cover these procedures in adequate detail).

Training Issues

1. Both operator and maintenance personnel stated that they "did not receive enough in-depth training on the system in the various modes" (i.e., HAVEQUICK), currently the squadron personnel are learning by "word of mouth", "trial and error" and "on the job training". This training was given by a pilot who took the initiative to learn the system on his own and develop a power point presentation to train the remaining squadron personnel, he has since left and the squadron has lost this "corporate knowledge".
2. Operator personnel are not receiving supplemental training, and formal training on the system is vague.
3. Maintenance personnel stated that "troubleshooting is difficult due to load problems with the CYZ-10/DTD as a result of lack of training".
4. Operator personnel are relying on "word of mouth" and "trial and error" (i.e., information sharing from senior operators), there is no formal information sharing capability.
5. As a result of lack of training on the system, maintenance personnel are experiencing difficulties with the CYZ-10/DTD and not properly merging the data (i.e., operator's are unable to communicate with other platforms and squadrons).
6. The AN/ARC-210 Fill Program (AFP) is an excellent DOS-based software program but needs to be modified, currently the program is not IT-21/Windows NT compliant (i.e., program must be booted off of the disc and certain squadrons are not aware of this "work around").
7. Squadron personnel stated that "currently there is no NATEC assistance available on the system".
8. Not all squadrons have access to platform specific ICW developed for PMA209 by DCS, and those that do are not fully utilizing this resource (i.e., current staffing does not allow for refresher training on the system), however the squadrons who are utilizing the CBT were able to learn the data fill/load procedures and stated that it was a "valuable resource".
9. Current training curriculum does not include information on the CYZ-10/DTD.
10. Squadron personnel are not utilizing the SINCGARS mode and not all squadrons are utilizing HAVEQUICK (i.e., LOT 10 has 12 planes that do not contain the AN/ARC-210 system, since all aircraft do not contain the system detailed training has not been a priority).
11. Basic "differences training on the ARC-182 and AN/ARC-210 was provided on the system's new capabilities, but the training did not include detailed information regarding frequencies and Anti-jam (AJ) modes".
12. The NATOPS Manual (A1-F18AC-NFM-000) is vague and does not contain in-depth information regarding the AJ modes, therefore it is seldom being utilized by the operator personnel.
13. Due to incorrect merging of fill data with the CYZ-10/DTD, operator personnel are experiencing difficulties utilizing the system in combat mode.
14. Squadrons are receiving personnel directly from "A" School, due to staffing/manning problems personnel are not receiving training at the FRAMP/NAMTRAGRU level.
15. Instructors at the NAMTRAGRUDET stated the need for "more hands-on training and modified equipment".

16. Training at the NAMTRAGRUDET focuses more on the ARC-182 and "differences training" between the ARC-182 and AN/ARC-210 (i.e., training does not cover AN/ARC-210 in enough detail.
17. Instructors stated that the student's are having difficulty understanding the concept of "channelization" and "frequency hopping".

System Design Issues

1. All platforms, HAVEQUICK training nets are not hard wired into the system. There is an approved table of training net frequencies; however the specific order of loading each one seems to be an uncontrolled variable (i.e., order of load must match between radios or no HAVEQUICK communication is possible).
2. Operator personnel stated that "the system automatically defaults to FM mode, irregardless of what mode is selected".

Recommendations:

Technical Publication

1. Provide relevant source documentation to all squadron personnel (i.e., standardized work packages should be developed and provided to the fleet). The end user should not have to seek out data on new/modified systems.
2. Modify official publications to include detailed troubleshooting procedures and CYZ-10/DTD source data.

Training

1. Provide squadron personnel with in-depth training on the system in the various modes (i.e., HAVEQUICK), currently the squadron personnel are learning by "word of mouth", "trial and error", and "on the job training". HAVEQUICK can be reinforced with on-the-job training. HAVEQUICK training load data requires detailed planning, coordination, and execution between all involved aviation units.
2. Provide squadron personnel with all relevant source data and training guides (i.e., standardized work packages).
3. Provide squadron personnel with supplemental training on the system, formal training on the system is vague (i.e., curriculum only covers menu screen navigation, nothing on the in-depth functionality of the various modes). Training curriculum should also be modified to meet the fleet's needs.
4. Provide more hands-on training with the system, "troubleshooting is difficult due to load problems as a result of lack of documentation to train from".
5. Establish a formal information sharing capability (i.e., standardized work packages) for squadron personnel to share the required data not contained in official technical publications, they are currently relying on "word of mouth" and "trial and error" (i.e., information sharing from senior operators).

6. Modify the AN/ARC-210 Fill Program (AFP) DOS based software program, currently the program is not IT-21/Windows NT compliant (i.e., the program needs to be booted off of a floppy and not all squadrons are aware of this “work around”).
7. Provide all squadron personnel with the PMA-209/DCS Corporation platform specific ICW. Any CD-ROM computer hardware requirements must be resolved as well.
8. Modify the current training curriculum to include more functional and in-depth training for maintenance as well as operation of the system.

System Design

1. Investigate the feasibility of hard wiring HAVEQUICK training nets into the system.
2. Determine why the system automatically defaults to FM mode regardless of what mode is selected.

VII. FINDINGS/RECOMMENDATIONS SUMMARY TABLE

The following table is a consolidation of all of the findings and recommendations that we compiled and analyzed throughout all of the sites, platforms, and squadrons during the data analysis phase of the training situation analysis:

TABLE 3. FINDINGS AND RECOMMENDATIONS TABLE

SUBJECT	FINDINGS	RECOMMENDATIONS
Technical Publications	• Interim publications are being utilized, community is still awaiting the receipt of official publications for the system (i.e., official publications are 60 days late). • Maintenance technicians communicated the need for more detailed troubleshooting procedures and fault isolations within technical publications. • Maintenance technicians communicated the need for better schematics/diagrams to accurately display component location, identify wiring by location, and wire numbers within the technical publications. • Maintenance technicians stated that the technical publications are not "user friendly", are too vague, and need to be organized into a standardized format (i.e., table of contents, and designated sections). • Operators are utilizing their own KC130 Communication-Navigation Management System Operator Guide (in lieu of official publications) to learn the system, this manual is primarily for CDNU operation and only covers the AN/ARC-210 system in emergency mode operation. • Airborne and detachment personnel are relying on squadron for publication data. • Squadrons have not received modified publications that include system updates for the 1556A (AV8B Community).	• Copies of official and interim publications should be provided for airborne and detachment operations. • A formal publication review is highly recommended prior to the distribution of official technical publications. • Squadrons need to receive official publications (i.e., including in an organized, and standardized format). • Official publications need to be modified to incorporate 1556A (AV8B Community) modifications and relevant system interface information (i.e., RCU and CDC/CDM interfaces). • The manufacturer's manual should be modified to explain platform specific scanlist functions and operations. • Standardized operator and maintenance checklists/job aides and training guides should be provided (currently, pilots and maintainers are developing their own) to promote information sharing within the squadrons. • Published loading procedures for electronic protection and logic converter modes should be updated to provide reliable information on the two modes.

SUBJECT	FINDINGS	RECOMMENDATIONS
Technical Publications (cont.)	• Operators and maintainers are creating their own checklists and training guides to compensate for insufficient publications and manuals. • The NATOPS manual is currently being updated and has yet to be provided to all squadrons. • The BellTectron helicopter manufacturer's manual was provided to operators and has been utilized for basic system understanding but is too complicated to be fully utilized. • The manufacturer's manual does not provide a detailed explanation of platform specific scanlist functions and operations (i.e., operator's are developing and relying on their own checklists for this information). • Squadron personnel stated that "published loading procedures for electronic protection and logic converter modes are too vague and unreliable". • Operator's stated that the "NATOPS manual is too vague". • There is a significant amount of source data that adequately covers AN/ARC-210 Data Transfer loading/merging/transferring procedures but are not currently available to all squadrons. • Maintenance technicians stated that they are having difficulty "loading/merging the cryptographic data into the Data Transfer Device (CYZ-10/DTD)", this difficulty is resulting in the operator's inability to communicate with other squadrons, commands, and platforms (current procedures are not covered in the technical publications). • Maintenance technicians stated that "operators are having difficulty using the data loads and initializing the system in HAVEQUICK modes", current publications do not cover the various modes in adequate detail.	• All relevant documentation should be provided to all squadron personnel (i.e., standardized work packages need to be developed and provided). • Source data books need to be provided to all squadron personnel (i.e., data transfer loading/merging/transferring procedures). The end user should not have to seek out data on new/modified systems. • Official publications should be modified to include detailed troubleshooting procedures and CYZ-10/DTD source data.

SUBJECT	FINDINGS	RECOMMENDATIONS
Technical Publications (cont.)	• Maintenance personnel stated that "troubleshooting the CYZ-10/DTD is difficult due to a lack of detailed procedures/inadequate publications". • The technical publications do not contain information regarding CYZ-10/DTD.	
Training	• Formal training (Lesson Plan C-102-4511) is now being implemented but little to no equipment is available to train on (i.e., modified simulators). • Due to staffing/manning problems training time is limited, personnel have little to no training on the system (i.e., instructors stated that "system prioritization and training is taking a back seat to crisis management"). • Training squadron is not set up to handle secure material (i.e., HAVEQUICK, SINCGARS). • Currently, there is non-platform specific computer-based training available at the squadrons to supplement formal training, however not every squadron is aware of and has access to this capability. • Operators and maintenance technicians stated that "tasks are performed too infrequently too master" (i.e., need more hands-on experience with the system). • Operator's and Maintenance personnel are not utilizing the system to it's fullest capabilities (i.e., operating in Electronic Protection (EP) modes). • NATEC representatives have provided limited technical training, squadrons do not have anyone to teach advanced aspects of the system.	• The amount of theory of operation, system functionality, system interface, and troubleshooting procedures being taught at the FRESTS needs to be increased. • Training should be reviewed and standardized for all squadrons. • Additional platform specific computer-based training should be provided to supplement formal and hands-on training and refresher training. • Training squadrons should be set up to handle the loading of secure material (i.e., HAVEQUICK, SINCGARS) to fully teach system capabilities. • NATEC training should be provided to all maintenance and operator personnel to provide more advanced training on the system (i.e., loading and operating system in electronic protection modes). • System interface information needs to be provided to the FREST and incorporated into the formal training curriculum

SUBJECT	FINDINGS	RECOMMENDATIONS
Training (cont.)	• There is no platform training standardization for operator and maintenance personnel. • Squadron personnel stated that they are learning the system through "trial and error" and "word of mouth". • There is a significant time gap between formal training and system utilization (i.e., no refresher training). • Little to no formal training has been provided to the squadrons, operator and maintenance personnel. • Currently there is no information sharing capability to learn advanced aspects of the system, operator and maintenance personnel stated that they are relying on "trial and error" and "word of mouth" to learn the system. • Currently the squadrons are not getting enough technical training and hands-on training with the system. • Training squadrons do not have modified simulators that include current systems (current simulator is outdated). • The operators are not receiving system functionality training on the advanced aspects of the radio, currently they are not operating the system to its fullest • capabilities. • Currently, the technical training syllabus does not include AN/ARC-210 system. • Simulators do not include the CYZ-10/DTD component. • Little to no information sharing is occurring within squadrons (i.e., some squadron maintenance and operation personnel did not know of available computer-based training courseware).	• Operators need system functionality training on the advanced aspects of the radio, currently they are not operating the system to its fullest capabilities. • The technical training syllabus needs to be updated to include the AN/ARC-210 system. • Platform specific computer-based training should be provided to the squadrons for refresher training on the system. • More formal and hands-on training should be provided to operator and maintenance personnel. • An information sharing capability needs to be established to learn advanced aspects of the system, operator and maintenance personnel are relying on "trial and error" and "word of mouth" to learn the system. • Squadrons should be provided modified simulators that include CYZ-10/DTD components. • Squadrons need to start utilizing their current non-platform specific courseware for refresher and supplemental training. • Squadrons should be provided with the PMA-209/DCS Corporation platform specific ICW. Any CD-ROM computer hardware requirements must be resolved as well.

SUBJECT	FINDINGS	RECOMMENDATIONS
Training (cont.)	• AN/ARC-210 Fill Program (AFP) is an excellent DOS based software program but needs to be modified, currently the program is not IT-21/Windows NT compliant (i.e., the program needs to be booted off of a floppy and not all squadrons are aware of this "work around"). • Formal training is currently in development and should be completed by 15 June 99 (AV8B Community). • AV8B squadrons just received the system March 99 and did not receive any training materials with the system (i.e., they have the equipment but little to no formal system information). • Squadrons did not receive system integration training. • System interface training was not received. • Little to no NATEC training was provided to the squadrons. • Only a limited number of operators were provided with basic technical training at the FREST level and full system capabilities (i.e., electronic protection modes) have not been taught or utilized. • The (CH-53) FREST has platform specific courseware and has utilized the courseware to develop formal lesson plans, but are not utilizing the computer-based training as a supplement to formal training. • Current training curriculum is well written (C-102-9945A) and covers full system capability (i.e., detailed loading and operating guides for the electronic protection modes). • Maintenance personnel are "double loading" the DTD and not properly merging the data (i.e., double loading is resulting in the operator's inability to communicate with other platforms, and squadrons). • The AN/ARC-210 Fill Program (AFP) is an excellent DOS-based software program but	• The current training curriculum should be modified to include more functional and in-depth for maintenance as well as operation of the system (i.e., CYZ-10/DTD needs to be incorporated into the lesson plan and one assigned to NAMTRAGRUDET Lemoore). • Training curriculum should be modified to cover sub menu displays in greater detail. • SAMT simulator should be modified to include loading/fault occurrences with the system. • Current computer aided instruction being utilized within the NAMTRAGRUDET Electronic Classroom (ECR) is vague and should be modified to include more detailed functionality of the system. • Source data books should be provided to all squadron personnel (i.e., data transfer loading/merging/transferring procedures). The end user should not have to seek out data on new/modified systems. • Official publications should be modified to include detailed troubleshooting procedures and CYZ-10/DTD source data. • Squadron personnel should be provided with in-depth training on the system in the various modes (i.e., HAVEQUICK), currently the squadron personnel are learning by "word of mouth", "trial and error", and "on the job training". HAVEQUICK can be reinforced with on-the-job training; SINCGARS has no equivalent training mode to reinforce theory of

SUBJECT	FINDINGS	RECOMMENDATIONS
Training (cont.)	needs to be modified, currently the program is not IT-21/Windows NT compliant (i.e., program must be booted off of the disc and certain squadrons are not aware of this "work around"). • NATEC representatives received very high level training from Boeing, but no training was provided by Rockwell Collins on the actual system itself. • Classified Material System (CMS) is only providing certain squadrons with one DTD instead of the two devices they are supposed to receive (requires further research, maybe a low supply/logistics issue). Additionally, NAMTRAGRUDET Lemoore is not being provided with a CYZ-10/DTD. • NATEC representatives no longer have access to a DTD to utilize for hands-on training. • Simulated Aircraft Maintenance Trainer (SAMT) simulator is available at the NAMTRAGRUDET but is outdated and does not include loading/fault insertion with the system (NAMTRAGRUDET Lemoore naval message 211425Z-JUN-99 refers to this issue). • NAMTRAGRU DET has a learning resource facility but according to the instructors "the resource is seldom utilized", the location is inconvenient for daily use. While both areas are onboard NAS Lemoore, the squadrons are located about seven miles from the NAMGRAGRUDET location.	operation. • Squadron personnel should receive supplemental training on the system, formal training on the system is vague (i.e., curriculum only covers menu screen navigation, nothing on the in-depth functionality of the various modes). Training curriculum should also be modified to meet the fleet's needs. • All relevant documentation should be provided to all squadron personnel (i.e., standardized work packages need to be developed and provided). • Maintenance personnel should be provided more hands-on training with the system, "troubleshooting is difficult due to load problems as a result of lack of documentation to train from". • A formal information sharing and update capability should be established for squadron personnel and between squadrons/platforms for the required data not contained in official technical publications, they are currently relying on "word of mouth" and "trial and error" (i.e., information sharing from senior operators). • NAMTRAGRU DET has an electronic classroom facility, however instructors stated that "current computer aided instruction is vague and should be modified to include in-depth functional training".

SUBJECT	FINDINGS	RECOMMENDATIONS
Maintenance Procedures	• Due to antiquated equipment and aircraft, electrical shorts are effecting system operation and maintenance. • Squadrons do not have adequate troubleshooting/fault isolation and system operation checklists (in many cases they are developing their own materials). • Squadron personnel felt that they are not receiving enough hands-on time with the system.	• Squadrons should be provided with detailed troubleshooting/fault isolation and system operation checklists (maintenance and operator personnel are currently developing their own materials). • Formal visual inspection procedures (i.e. 56 day maintenance requirement card) for receiver/transmitter mounts need to be established and conducted to address corrosion and environmentally induced damage related issues with the equipment.
System Design	• Location of Logic Converter (CV) is difficult to access (i.e., not clearly marked in the aircraft). • Squadrons do not have load cable for electronic protection modes (i.e., loading from DTD to A/C). • AH-1W has very complex wiring components and is difficult to operate and maintain (i.e., publications contain vague schematics and wiring diagrams). • Operator and maintenance personnel are experiencing "bleed over" with the IFF system because both systems utilize the same antenna. • Antenna location (CH-46E Community) is creating weak signals/frequencies and communication problems. • Remote Head component locks up during operation and will not take frequencies.	• Antenna location (CH-46 Community) should be re-examined, dual antennas should be provided to solve weak communication issues with signals and frequencies. • Antenna (CH-53E Community), providing dual antennas may solve weak communication issues with signals and frequencies. • J5 on COM 1 Connector should be re-adjusted to connect at a straight connector (i.e., connector currently connects at a 90degree angle).

SUBJECT	FINDINGS	RECOMMENDATIONS
System Design (cont.)	• Squadrons experienced several manufacturing defects with the receiver/transmitters and had the component replaced under the manufacturer's warranties. • Single antenna location is creating weak signal and frequency problems. • Squadrons are currently experiencing slight corrosion problems with the receiver/transmitter mounts. • Modified logic converter (CV) wires are creating troubleshooting difficulties (i.e., complex wiring). • Radio range is limited and volume's (CH-53E's) are inconsistent with other radios (i.e., AN/ARC-210 volumes are not as loud). • All platforms, HAVEQUICK training nets are not hard wired into the system. There is an approved table of training net frequencies; however the specific order of loading each one seems to be an uncontrolled variable (i.e., order of load must match between radios or no HAVEQUICK communication is possible). • F-18 only, the J5 connector on COM 1 connector is difficult to manipulate/remove and replace (i.e., connects at a 90degree angle which places strain on the cable attached to it due to its proximity to other fixed-in-place cables immediately to the right/forward of the J5 cable).	

VIII. CONCLUSION

Results of this analysis provide critical information for making informed decisions regarding the future integration of AN/ARC-210 (V) system implementation into the fleet. Of the key areas examined throughout the study the following conclusions were made:

- System design/reliability – overall findings indicated that the system is performing as intended and has proven to be a reliable alternative to it's predecessor, the AN/ARC-182

- Operator and maintenance performance of the system - due to a lack of adequate source documentation, squadron personnel are relying heavily on "trial and error" and "word of mouth" to operate and maintain the system, communities are not fully utilizing the advanced capabilities of the radio

- Instructional curriculum/delivery - system integration was ineffective, training and source data when provided to the fleet (in several cases, communities are still awaiting receipt of these materials) are incomplete and are not providing effective support for the system

- Training on the CYZ-10/DTD device is crucial and needs to be provided to the fleet in order for the squadron personnel to understand how to operate the AN/ARC-210 (V) system in the advanced Electronic Protection Modes

- Technical publications - several communities are still awaiting the receipt of official publications for the system (i.e., communities are currently relying on interim publications)

- Publications need to be modified to include:
  - More detailed trouble shooting procedures and fault isolation information
  - Better schematics/diagrams to accurately display component location, identify wiring by location, and wire numbers within the technical publications
  - Better organization, technical publications are not "user friendly", are too vague, and need to be organized into a standardized format (i.e., table of contents, and designated sections)
  - Standardized work packages for the system

Throughout this report, several recommendations were made regarding the training, integration, operation and maintenance of the AN/ARC-210 (V) system to improve the training effectiveness within the Aviation Maintenance Training and the Air Combat Training Continuums. These recommendations should be utilized to determine future AN/ARC-210 (V) training, integration and systems usage by fleet activities.

APPENDIX A

SURVEY SAMPLE

AN/ARC – 210 (V) FLEET TASK ANALYSIS SURVEY

RATING: _____ **PLATFORM: _____** **SQUADRON: _____**

PAY GRADE:_____

TOTAL YRS OF EXPERIENCE IN AIRCRAFT MAINTENANCE OR OPERATION: _____

TOTAL YRS OF EXPERIENCE ON THE SYSTEM: _____

Have you received formal training on the system? _____

If so, when and where did you receive the training:_____

Are CBT resources available to you? _____ If so, are they useful/beneficial?

NAVAIRSYSCOM (PMA2053E3) has contracted for the development of a training situation analysis on the operation and maintenance of the AN/AN/ARC-210 (V) Electronic Protection Radio System. This task analysis survey will provide contractors with critical information regarding the criticality, difficulty, and frequency of the job tasks performed during the operation and maintenance of the system.

Frequency Ranking Scale: How often is the task performed?
1 = infrequently: 4 times or less per year
2 = moderate frequency: once a month
3 = high frequency: 2-10 times per month
4 = very high frequency: more than 10 times per month

Criticality Ranking Scale: What is the impact on the mission if the task is performed poorly?
1 = very low/no impact
2 = moderate impact (delays maintenance or operation but no damage to aircraft or injury to personnel)
3 = high impact (mission degradation, damage to aircraft or injury to personnel)
4 = very high impact (unable to perform mission, loss of aircraft, loss of life, safety of flight)

Difficulty Ranking Scale: How difficult is the task to perform?
1 = simple task - easy to learn and perform
2 = moderate task – moderately difficult to perform
3 = complex task – some parts of the tasks are difficult
4 = very complex – high level of difficulty throughout the task

REASONS WHY DIFFICULT

1. No formal training	2. Publications inadequate	3. Components difficult to locate	4. Complex - many interrelated parts
5. Components/equipment difficult to maneuver/reach	6. No/limited replacement parts	7. Performed too infrequently to master	

AN/ARC-210(V) Electronic Protection Radio System
Fleet System Survey

TASK	COMPONENT	FREQUENCY				CRITICALITY				DIFFICULTY				SPECIFIC AREAS OF DIFFICULTY	MAIN REASON(S) WHY DIFFICULT
LOCATE	RECEIVER TRANSMITTER (RT)	1	2	3	4	1	2	3	4	1	2	3	4		
OPERATE	RT in HAVEQUICK/SINGCARS MODES	1	2	3	4	1	2	3	4	1	2	3	4		
REMOVE AND REPLACE	RECEIVER TRANSMITTER (RT)	1	2	3	4	1	2	3	4	1	2	3	4		
OPERATIONAL TEST	RECEIVER TRANSMITTER (RT)	1	2	3	4	1	2	3	4	1	2	3	4		
TROUBLESHOOT	RT in HAVEQUICK/SINGCARS MODES	1	2	3	4	1	2	3	4	1	2	3	4		
LOCATE	CONTROLS	1	2	3	4	1	2	3	4	1	2	3	4		
REMOVE AND REPLACE	CONTROLS	1	2	3	4	1	2	3	4	1	2	3	4		
OPERATIONAL TEST	CONTROLS	1	2	3	4	1	2	3	4	1	2	3	4		
TROUBLESHOOT	CONTROLS	1	2	3	4	1	2	3	4	1	2	3	4		
LOCATE	MOUNTS	1	2	3	4	1	2	3	4	1	2	3	4		
REMOVE AND REPLACE	MOUNTS	1	2	3	4	1	2	3	4	1	2	3	4		
OPERATIONAL TEST	MOUNTS	1	2	3	4	1	2	3	4	1	2	3	4		
TROUBLESHOOT	MOUNTS	1	2	3	4	1	2	3	4	1	2	3	4		
LOCATE	ANTENNA	1	2	3	4	1	2	3	4	1	2	3	4		
REMOVE AND REPLACE	ANTENNA	1	2	3	4	1	2	3	4	1	2	3	4		
OPERATIONAL TEST	ANTENNA	1	2	3	4	1	2	3	4	1	2	3	4		
TROUBLESHOOT	ANTENNA	1	2	3	4	1	2	3	4	1	2	3	4		
LOCATE	LOGIC CONVERTER (CV)	1	2	3	4	1	2	3	4	1	2	3	4		
REMOVE AND REPLACE	LOGIC CONVERTER (CV)	1	2	3	4	1	2	3	4	1	2	3	4		
OPERATIONAL TEST	LOGIC CONVERTER (CV)	1	2	3	4	1	2	3	4	1	2	3	4		
TROUBLESHOOT	LOGIC CONVERTER (CV)	1	2	3	4	1	2	3	4	1	2	3	4		
LOCATE	REMOTE INDICATOR (ID)	1	2	3	4	1	2	3	4	1	2	3	4		
REMOVE AND REPLACE	REMOTE INDICATOR (ID)	1	2	3	4	1	2	3	4	1	2	3	4		
OPERATIONAL TEST	REMOTE INDICATOR (ID)	1	2	3	4	1	2	3	4	1	2	3	4		
TROUBLESHOOT	REMOTE INDICATOR (ID)	1	2	3	4	1	2	3	4	1	2	3	4		
LOCATE	AMPLIFIER (AM)	1	2	3	4	1	2	3	4	1	2	3	4		
REMOVE AND REPLACE	AMPLIFIER (AM)	1	2	3	4	1	2	3	4	1	2	3	4		
OPERATIONAL TEST	AMPLIFIER (AM)	1	2	3	4	1	2	3	4	1	2	3	4		
TROUBLESHOOT	AMPLIFIER (AM)	1	2	3	4	1	2	3	4	1	2	3	4		
LOCATE	LNA DIPLEXER	1	2	3	4	1	2	3	4	1	2	3	4		

AN/ARC-210(V) Electronic Protection Radio System
Fleet System Survey

REMOVE AND REPLACE	LNA DIPLEXER	1	2	3	4	1	2	3	4	1	2	3	4		
OPERATIONAL TEST	LNA DIPLEXER	1	2	3	4	1	2	3	4	1	2	3	4		
TROUBLESHOOT	LNA DIPLEXER	1	2	3	4	1	2	3	4	1	2	3	4		
LOCATE	DAMA MODEM (MD)	1	2	3	4	1	2	3	4	1	2	3	4		
REMOVE AND REPLACE	DAMA MODEM (MD)	1	2	3	4	1	2	3	4	1	2	3	4		
OPERATIONAL TEST	DAMA MODEM (MD)	1	2	3	4	1	2	3	4	1	2	3	4		
TROUBLESHOOT	DAMA MODEM (MD)	1	2	3	4	1	2	3	4	1	2	3	4		

Please rate the following section (1-5): 1=Very Poor 2=Poor 3=Adequate 4=Good 5=Excellent

ACCURACY	TECHNICAL PUBLICATIONS		1	2	3	4	5	
AVAILABILITY	TECHNICAL PUBLICATIONS		1	2	3	4	5	
USEFULNESS	TECHNICAL PUBLICATIONS		1	2	3	4	5	

Other Comments:

APPENDIX B

SITE SUMMARY DATA

TABLE 2: SURVEY SITE SUMMARY

SITE	Squadron	Platform	IX. NUMBER OF RESPONDENTS					
			AT's	Reps	Pilots	Instr	Ops	Total
MCAS CHERRY POINT	VMA-223	AV8B	4		7			11
	VMA-542	AV8B	3					3
	VMAT-542	AV8B				1		1
	VMGR-252	KC-130	6					6
	VMGRT-253	KC-130	5	1	1	4		11
MCAS NEW RIVER	HMM-263	CH-46E	1					1
	HMM-266	CH-46E	1				**1	2
	HMLA-269	UH-1N	4		5			9
	HMLA-269	AH-1W			1			1
	HMM-266	H-1	1					1
	HMLA-167	UH-1N	3		5			8
	HMM-266	H-1	1					1
	HMT-204	CH-46E	3				**1	4
	HMM-266	CH-53E	1					1
	HMT-302	CH-53E	4		2	4		10
	HMH-461	CH-53E	5		2			7
	HMT-204	CH-53E		4		2		6
NAS LEMOORE	VFA-22	F-18C	4					4
	VFA-113	F-18C	2					2
	NAMTRA	F-18C				*3/2PM's		5
	VFA-125	F-18C	2					2
	VFA-94	F-18C		1	2			3
MCAS MIRAMAR	VMAT-101	F-18D	1		3			4
	VMFA-225	F-18C	1		6			7
	VMFA-314	F-18C	4		1			5
	VMFA-121	F-18D	1					1
	HMH-361	CH-53E	6		1			7
	HMH-466	CH-53E	3		1			4
	HMH-462	CH-53E	6		4			10
	HMM-163	CH-46E	2					2
	HMM-166	CH-46E	2		3			5
	HMM-161	CH-46E	2		4			6

TABLE 2: SURVEY SITE SUMMARY (cont.)

Site	Squadron	Platform	X. NUMBER OF RESPONDENTS					
			AT's	Reps	Pilots	Instr	Ops	Total
MCAS CAMP PENDELTON	MALS-39	H-1	2					2
	HMM-364	CH-46E	4		2			6
	HMLA-367	AH-1W			1			1
	HMLA-367	UH-1N			1			1
	HMLA-369	H-1	1					1
	HMLA-267	UH-1N			4			4
	HMLA-267	AH-1W			1			1
	HMLA-267	H-1	6					6
	HMLA-367	H-1	1					1
	HMMT-164	CH-46E	1		1			2
	HMT-303	H-1	10			2		12
	NATEC	H-1/CH-46E		1				1
NAS OCEANA	VFA-34	F/A-18C	4		2			6
	VFA-105	F/A-18C			4			4
	VFA-83	F/A-18C	1	1	4	2		8
SITE SUMMARY								**213**

*Note- Site NAS Lemoore includes 3 Instructors and 2 Program Managers

** Note- Ops include general air crew personnel (i.e., Naval Flight Officers, In-flight technicians, flight engineers….)

APPENDIX C

INSTRUCTOR INTERVIEW RESPONSES

NAS LEMOORE, MCAS MIRAMAR, MCAS CAMP PENDELTON

INSTRUCTOR INTERVIEW RESPONSES

1. Describe the training for the AN/ARC-210 system.

(a) Week long training course. No CBT used. NATEC representative developed this course.

(b) AN/ARC-210 training is done at the FREST, starting at the basic level to intermediate operation and code learning procedures.

(c) CBT and Electronic Classroom (ECR)/maintenance by ECC International Corp. Simulator Avionics System SAMT. 18 hrs lecture/4 hrs lab. (12 → 182 and 210/ 6 → Remove and Replace/Testing/Troubleshooting).

(d) Basic description and operational of the system to include all testing, troubleshooting, removal and installation procedures.

(e) Basic coverage for UHF/VHF/ADF/secure speech (1 day) HAVEQUICK/SINCGARS (1 day) instructor basic operation, not in-depth.

2. Does training fit into the training continuum appropriately (i.e., dealt with correctly)?

(a) Yes.

(b) No, training should be geared more toward maintenance and away from operational. Need more on troubleshooting procedures and theory of operation.

(c) Yes, we amplify what advantages the AN/ARC-210 has over the ARC-182.

(d) Yes.

3. Is the training effective? What works?

(a) Yes.

(b) Yes. At our level of training we cannot over-teach specifics of the AN/ARC-210 due to the high volume of systems for UH-1N and AH-1W that we do teach.

(c) A lot of information (3 month track). Menu familiarity works well.

(d) Getting the students to know how to navigate around the publication. Computer Aided Instruction (CAI) is very effective as well with the use of animated schematics.

(e) Some students pick up system well. Some students know how to look up info from pub but could use more time on the in-depth functions of the radio.

4. What doesn't work and how would you change it?

(a) Not enough practical instruction with the system, need to implement more hands on training.

(b) Due to the complexity of the system's operation AN/ARC-210 training needs to be more in-depth for the various functions of the radio.

(c) CYZ-10/DTD is utilized and needs to be incorporated as add on to training for hands on training (could use more simulator type video/instruction on how to use).
(d) Going into operation from a pilot's point of view. Need to teach from the technicians point of view. Need more of a in-depth technical perspective on the system operation/maintenance and functionality.
(e) Most students will not check into AT's w/c for 1-3 years.

5. What's unique about the system that presents training challenges?

(a) Getting guys to use it on a regular basis.
(b) Pubs only cover differences in capabilities between the 182 and 210 models.
(c) Navigating around the menus.
(d) Squadron personnel are only receiving "differences" training between the 182 and 210 models, need more in-depth training on system functionalities (operation and maintenance).

6. How often is training provided on the system?

(a) Depends on unit.
(b) Every three (3) weeks with each new class.
(c) 1 section/week long with communication lesson information.
(d) Each student who is assigned to a pipeline will receive this training.
(e) Two (2) days.

7. Does training match up with system operation and maintenance needs? If there are deficiencies, what are they?

(a) Need more detailed instruction regarding maintenance of the system.
(b) Here at NAMTRAGRUDET Lemoore we don't teach the CYZ-10/DTD.
(c) Need to teach in-depth, hands on training of the CYZ-10/DTD.

8. Does the training maximize learning?

(a) No. Students are better taught with hands on. Pubs need to be more detailed.
(b) Yes.
(c) Yes.
(d) From the current course, the students are learning to the best ability of their ability, however training needs to be more in-depth and practical.
(e) Yes, students have good understanding of pub.

9. What system aspects are difficult for students to learn?

(a) Not a user friendly interface. System is not easy to figure out.
(b) SINCGARS and HAVEQUICK frequency hopping etc.
(c) Menu utilization (did not utilize menu displays out of pubs). (i.e., press x + y is displayed)
(d) Multi-layer menu takes time to grasp.
(e) Student lack test sets and need more hands on time with the system.

10. What training or performance challenges exist with the system?

(a) Building loadsets, integrating loadsets with ground units.
(b) System interfaces are complicated and need to be taught more in-depth.
(c) Keying the radios, nothing is taught with the CYZ-10/DTD and loading procedures.
(d) Advanced aspects of radio are complicated and not being taught in enough detail.

11. What aspects of the system are difficult to teach? Why are they difficult?

(a) SINCGARS, HAVEQUICK, ERF (Electronic Remote Fill).
(b) SINCGARS and HAVEQUICK, acronyms similar in each system but not the same.
(c) Menu utilization.
(d) From a qualified instructors point of view there are no difficult points.
(e) Learning Terms.

12. What is the optimum time required on the system? How much time is allotted?

(a) Depending on if platform can afford to let guys go into trainer. If pilots are flying maintainers are needed. Course takes back seat.
(b) Time allocated is appropriate.
(c) About 4 hours on the AN/ARC-210. The system is combined with ARC-182, KY-58, and ADF for a total of 12 hours.
(d) 1 day for HAVEQUICK/SINCGARS -- 1 day for UHF/VHF ADF and secure speech.

13. Are tools, support equipment, and materials needed for operating and maintaining the system available and utilized during training? If no, what is lacking?

(a) All support equipment is available.
(b) Using CD-ROM presented by PMA209 on AN/ARC-210.
(c) CYZ-10/DTD, nothing else.
(d) Yes, CYZ-10/DTD.
(e) Unable to load HAVEQUICK loads on A/C (CYZ-10/DTD).

14. Will analogies help illustrate the training curriculum (i.e., diagrams, visuals…)?

(a) Yes, platform specific Computer Based-Training (CBT) would be helpful.
(b) What we currently utilize works well enough for now. As we approach conversion to CBT, further information may be required if not available through other sources. CBT is specific to H-52 and is at the flight simulator (operator). Plan to develop maint CBT within next 2-3 years.
(c) Better diagrams for CBT/sub menu displays.
(d) Yes, the CAI is useful with what we are teaching currently.

Additional Comments/Notes:

(a) Most training from text is received from manufacturers.
(b) The Pubs are inefficient and too vague.
(c) Many pilots do not know system functions.
(d) They do not understand electronic protection modes.
(e) No formal training for pilots.
(f) Having to self-teach the system because current training is not detailed enough and does not offer practical hands-on experience with the system.
(g) Legitimate problem, HAVEQUICK (HQ) and SINCGARS (SC) modes are really complex and not taught in enough detail.
(h) Programs used to convert SINCGARS LST files are different.
(i) When building up load set it does not work.
(j) Marine Ground Forces can switch between five net Ids, but only have one net ID (automatic transfer) could be a battlefield problem.
(k) Three and one-half months of training and one day on AN/ARC-210 Basic to Intermediate.
- Turn on radio and able to understand function of radio on this level.
- Training needs to be more hands on and practical.
- On this level it is taught on a much broader spectrum. Its not AN/ARC-210 specified though -too general.

(l) The AN/ARC-210-specific CBT provides basic menu screen navigation and shows the various modes. (Maritime/SINCGARS). This basic introduction to some complex modes resulted in the following:
- Crews mostly just use the familiar 182-like capabilities
- Pilots can transfer codes/modes airborne (MWOD), but are having trouble communicating due to incorrect fills and not enough training on the system

(m) Have PMA209 Interactive Courseware (good for loading) , however CBT is not being utilized in the classroom → loading not covered in pubs
(n) Pubs are inadequate (too vague, not user friendly)
(o) Need more detailed training on HAVEQUICK (currently personnel are relying on OJT)
(p) Have system available to fleet for more hands on training
(q) Need a modified simulator for functional and BIT (no loading) fault occurrences
(r) Requests Simulated Avionics Maintenance Trainer (SAMT) for C/D aircraft modification → but no funding (which replaced panel trainers for A version)
(s) AT work center should have laptop provided with the system, but the laptop has been diverted, in-house, to the operators.
(t) Would like to get some feedback from the fleet to aid in the annual course reviews.
(u) The Temporary Assignment Duty problem the Navy has, drastically affects the learning curve of the students. The students know they will be going TAD for at least 1-2 years and will not see any of the systems that are taught at the "school."

MCAS CHERRY POINT

INSTRUCTOR INTERVIEW RESPONSES

1. Describe the training for the AN/AN/ARC-210 system.

(a) Technical point -- need to have more technical support. NATEC reps not always available.
(b) Majority out of book; simulator (no simulator syllabus); no NAV station in simulator; go through checklist and cockpit (intro training).
(c) Modified version of Little Rock training. Staffing issues take away simulator/training time. Not enough quotas for Little Rock training (w/about 4 pilots 1 or 2 a year).
(d) Primarily passed from one technician to another, very little structure.
(e) Trial and error, no detailed maintenance training.
(f) Given no training had (participated) mini ILSMT by Rockwell. Given detailed briefings from overviews. Management perspective was satisfactory. Very complex system.

2. Does training fit into the training continuum appropriately (i.e., dealt with correctly)?

(a) Yes, placed at the end of training after Intro to Airframes change (group of changes not just radio).
(b) Fits pretty good with continuum. Geographic preferences with here and Little Rock. Do not have adequate resources (old aircraft breaking down a lot).
(c) No. Training is usually at the last minute in "panic" situations or "oh by the way, we need this."
(d) Still developing curriculum. Need training from manufacturer.
(e) In '96 NASEU/NATEC took over training responsibilities would receive training and tasked with training marines. Money constraints (did not go into training pipeline).

3. Is the training effective? What works?

(a) No, need more hands on training, squadron personnel rely heavily on the pubs (meticulous) need corporate knowledge.
(b) CBT is beneficial, 5 weeks ground school then individual effort; Prioritize students by performance; 20-30 weeks to qualify depending on aircraft reliability for flight time and skill.
(c) Don't have enough people to keep planes up. Catch 22 with training and actual fleet activity. Only have (2) planes with 210.
(d) Scale of 1-10, I give it a 5. Hands on, OJT works.
(e) Need data on Automatic Target Handoff System (ATHS) works w/AN/ARC-210 and communicates w/1556. Modifications to 1556A (AV8B) can be used for other platforms.

4. What doesn't work and how would you change it?

(a) Very vague, high level training. No one to teach advanced aspects (full operation) of system. Break in time when taught to practical application of knowledge, need more hands on training with the system.
(b) Fleet squadron gets more detailed. Need actual system hands on simulator.
(c) Scheduling of aircrew and personnel. If technicians are at home base, other priorities take precedence over training (i.e., "crisis management").
(d) Additional functions from 182 added controls not reflected with 1556A, not teaching fullest capability of system integrations/installations. Workpage controls and indicators showing "not used" functions.

5. What's unique about the system that presents training challenges?

(a) Manual entry of HAVEQUICK data with emergency radio select panel. Anti-jam mode, use it or lose it.
(b) Nothing that stands out.
(c) Not enough training is provided on the system.
(d) Different platform, type, model, series of a/c utilize different interfaces.
(e) CDC System/AV8B. CDNU KC130 integration problem w/CDC and ARC210 need to get training from programmers.
(f) General operation – loading crypto and CYZ-10/DTD.

6. How often is training provided on the system?

(a) Once.
(b) Have six (6) instructors at each squadron. Corporate knowledge and experience.
(c) Approximately one (1) time a year.

7. Does training match up with system operation and maintenance needs? If there are deficiencies, what are they?

(a) No pubs, corporate experience/knowledge. Received in '97….still new.
(b) Not getting done in an organized way, but getting done.
(c) Yes, but if the technicians don't get a chance to use it, it is easily forgotten.
(d) Load, read options from RCU are displayed on CDM.

8. Does the training maximize learning?

(a) No, need more repetition, good step by step instructions. Using interim pub (not official).
(b) Yes, in cases where user supports the training effort.

9. What system aspects are difficult for students to learn?

(a) Operation and maintenance is difficult. Loading HAVEQUICK, anti-jam modes in real time situation. Duplication problem when fault is found.
(b) Training in fleet is OJT and trial and error. Need more in-depth formal training.
(c) Utilizing the software to develop loads.

10. What training or performance challenges exist with the system?

(a) Maintenance loads crypto data; six days worth of data. Understanding how to operate and maintain the CYZ-10/DTD.

(b) Manning and staffing; antiquated aircraft; no simulator to play with before aircraft.

(c) System does not get utilized to fullest extent, need more training on the advanced aspects of the system (i.e., EP modes).

11. What aspects of the system are difficult to teach? Why are they difficult?

(a) CDNU training is keystone to understanding radio and not covered in enough detail.

(b) Only training basic functions of system due to manning problems.

(c) Again, using the AN/AN/ARC-210 Data Fill (ADF) software because it is DOS based.

12. What is the optimum time required on the system? How much time is allotted?

(a) Two (2) days. (One on one actual hands on).

(b) Need simulator time, more hands on training

(c) 3-4 days required, 1-2 days allotted.

13. Are tools, support equipment, and materials needed for operating and maintaining the system available and utilized during training? If no, what is lacking?

(a) Official Publications.

(b) Use to systems not working on aircraft (old birds) have electrical problems, old wires, electrical shields breakdown. Nobody knows how to use system, use to KY old system.

(c) Yes.

14. Will analogies help illustrate the training curriculum (i.e., diagrams, visuals…)?

(a) No, have best training aide – utilizing actual system itself. No memory in course, no NAVAIR pubs. Need to get to level of competence using interim pubs.

(b) Yes - would like "Hot bench" mock-ups, if available.

Additional Comments/Notes:

- Lesson Plans: 1st operation (classroom); 2nd (hands on) maintenance/operation (emergency) lab; 3rd HAVQUICK and SINCGAR modes (SAICOM operation). DTD/AFP (problems) not loading on the computer correctly; consolidation single; old 486 (DOS based) combined data with bus data. Tech reps are not always available, need to be modified. Training not detailed enough regarding advanced concepts of the system. DTD is very complex (have manual) and a pub for that data transfer device takes load set and downloads into aircraft. Many interrelated parts, no instructions on interfaces and need more training on the CYZ-DTD.
- Radar INS and ARC Systems – prioritize equally; type of mission; ARC is good for meters/feet not miles + good location for refueling; need to stay in specific area as receivers. No complaints on system just don't have a lot of knowledge on it. Syllabus is outdated need to be modified with newer equipment. Need idiot's guide with system capabilities. Do not have secure area for classified data. Have operational guide KC-130 COMM and NAV Mgmt System, primarily CDNU "Brains of System" ARC (emergency mode).
- System reliability for the AN/ARC-210 (V) is excellent overall, which does not give the technician much chance to troubleshoot system. Doesn't help experience/familiarity, need more hands on, in-depth training on the system.
- Maintenance Training Requirements Review (MTRR) stated training requirement would be updated with revised COMM. Pubs have incorporated (but very vague) ARC210 shows platform troubleshooting for COMM system. No HW (trainer) 11H94 (Trainer COMNAVWEAPONS Device) will be incorporated (some graphics are already course # developed). "C-102-9895 revision will be BRAVO which lengthened the course by two days.

MCAS NEW RIVER

INSTRUCTOR INTERVIEW RESPONSES

1. Describe the training for the AN/AN/ARC-210 system

(a) I believe what we teach is simple and to the point. Very basic coverage of theory of operation, nothing pertinent to trouble shooting, data loading, etc.
(b) We provide basic system instructor led training detailing component locations, functions, system description and circuit.
(c) Used manufacturer's technical manual to write lesson material. Helped develop lesson plan for the H53-E using the platform specific CBT, personal experience, and Pubs.
(d) Classroom – very brief component location description, some operation and troubleshooting. Lab time – do not have CYZ-10/DTD to load data. Lab time on actual simulator (CMT) does not have capability to transmit or receive.
(e) Classroom – 4 hrs; Lab – 8 hrs; 2 ½ days of Lab; 24 hours total class time.

2. Does training fit into the training continuum appropriately (i.e., dealt with correctly)?

(a) Yes, it is the most up to date. Training is appropriate for the stage the student is at. Even experienced technicians benefit from this training.
(b) Yes, feedback from the user activities is positive. School initiates the call to fleet for feedback.
(c) Yes, pretty good format, but could be more in-depth.
(d) In the process of being combined with NAVCOM.
(e) Yes, currently switching to power point for Computer Aided Instruction (CAI).
(f) Yes, curriculum fits great.

3. Is the training effective? What works?

(a) The system the way we teach it works very well.
(b) As a whole everything in its current format works well.
(c) CBT is pretty good.
(d) Open book test – no problems there. Lab/simulator – need more hands on.
(e) Similar to 182, but no teaching advanced aspects of new system.
(f) No trouble w/HAVEQUICK not as complicated (need specific set of numbers to work). SINCGAR (too much to check to see if it works).

4. What doesn't work and how would you change it?

(a) Telling the students how the Data Transfer Device (DTD) works. It would be nice to show them.
(b) Our system maintenance trainer has yet to be modified with fault switches to allow practical troubleshooting experiences. Trainer Mods may begin within the next year or two.

(c) Does not have CYZ-10/DTD, asked for help on one, did not get one. Do have the means for CBT, however not fully utilizing this training material.
(d) Not sure – training on how HAVEQUICK and SINCGARS works, time would be better spent with NATEC Representative. Had NATEC training and was very effective.
(e) Pubs aren't very useful and instructors are not fully trained themselves.
(f) SINCGARS portion is a struggle because it's not necessary for instructor to learn in the fleet and there is not enough ARC-210 equipment to test it. How net understanding comes about.

5. What's unique about the system that presents training challenges?

(a) Having the student understand a WOD or MWOD and how it relates to the radio.
(b) Understanding Word of the Day. Develop something on an entry level.
(c) HAVEQUICK and SINCGAR loading and entering GPS time w/EP MODES are most complicated.
(d) Do not have ECR – EP Modes/don't have CYZ-10/DTD because of secure. CBT might be work around data that is load in it. Has one (1) computer.
(e) SINCGARS very complex east to confuse nets #'s (breaking down net # read i.e., HAVE QUICK, HAVE QUICK II)

6. How often is training provided on the system?

(a) Fifteen classes per year with eight (8) students. Every student gets the training.
(b) Fifteen classes per year receive this type training. Eight students per class (118 per year average).

7. Does training match up with system operation and maintenance needs? If there are deficiencies, what are they?

(a) Training works well however, they do not have a Data Transfer Device (DTD) at school. The CYZ-10/DTD would be really beneficial, it is used a lot in the fleet and there is currently no in-depth training on the device.
(b) Our system maintenance trainer has yet to be modified with fault switches to allow practical troubleshooting experiences. Trainer Mods may begin within the next year or two.
(c) Yes, training curriculum is pretty good; EP Modes are too vague
(d) Yes
(e) Yes, could use real life gripes and examples.

8. Does the training maximize learning?

(a) Yes, students are motivated to learn new systems
(b) No, our system maintenance trainer has yet to be modified with fault switches to allow practical troubleshooting experiences. Trainer Mods may begin within the next year or two.
(c) Absolutely, eight (8) hours theory and lab for students.
(d) Yes

9. What system aspects are difficult for students to learn?

(a) Most of the anti-jam mode, i.e. of day, WOD, MWOD, and over the air transfer.
(b) Test analyses indicate all trainers have no area(s) of difficulty.
(c) EP Modes equally complicated.
(d) HAVEQUICK and SINCGARS
(e) SINCGARS

10. What training or performance challenges exist with the system?

(a) Finding a way to do troubleshooting. The trainer has no faults put into the trainer – expecting trainer modes in near future.
(b) Our system maintenance trainer has yet to be modified with fault switches to allow practical troubleshooting experiences. Trainer Mods may begin within the next year or two.
(c) EP Modes
(d) EP Modes
(e) Need more hands on training, no field experience with 210's.

11. What aspects of the system are difficult to teach? Why are they difficult?

(a) None for instructor if appropriate time is used to prepare. Each instructor only teaches two (2) classes per year and has to maintain proficiency 17-week course.
(b) Understanding WOD and MWOD, as the instructor spends little extra effort.
(c) EP Modes
(d) EP Modes
(e) SINCGARS

12. What is the optimum time required on the system? How much time is allotted?

(a) Approximately 6-8 hours to do the lecture and a day (8 hrs) of lab time.
(b) Eight (8) hours lecture/four (4) hours lab, per trainer.
(c) Adequate as is.
(d) Yes, adequate (8 hours classroom/2 hours lab).
(e) Time is adequate.

13. Are tools, support equipment, and materials needed for operating and maintaining the system available and utilized during training? If no, what is lacking?

(a) No CYZ-10/DTD for data loading.
(b) Our system maintenance trainer has yet to be modified with fault switches to allow practical troubleshooting experiences. Trainer Mods may begin within the next year or two. CYZ-10/DTD would be very useful to teach data loading.

(c) CYZ-10/DTD would be very useful to teach data loading.
(d) Not really.

14. Will analogies help illustrate the training curriculum (i.e., diagrams, visuals…)?

(a) Yes, would like a more detailed diagram of the CYZ-10/DTD.
(b) What we currently utilize works well enough for now. As we approach conversion to CBT, further information may be required if not available through other sources. CBT is specific to H-53 and is at the flight simulator (operator). Plan to develop main CBT within next 2-3 years.
(c) No
(d) No computer based training available. Have hardware and would definitely welcome ICW, which focuses on system interfaces with CDNU.
(e) Power point → CBT.
(f) Mimic 182 and make analogies.

Additional Comments/Notes:

- We designed the course we teach and it seems to work well for the fleet.
- Good handouts, overall need more in-depth training on system functionality, theory of operation and system interfaces. Hands-on equipment; eye-level test set (TS3440); 2 days of training; condense to 8 hours.
- User friendly; straight forward except SINCGARS; stand alone AN/ARC-210 not interfaced w/ CDNU or CDC or up front controller for the CH-53 E's, which makes system a lot easier to teach and understand; junked 182's replaced with 210 (radio only).

NAS OCEANA/NAMTRAGRUDET

INSTRUCTOR INTERVIEW QUESTIONS

1. Describe the training for the AN/AN/ARC-210 system.

(a) 12 period lesson over all (lecture) 3hours on the system → 4-6 hours of aircraft time. Aircraft and trainer time (ADF, ARC…. combined lab) → 5 periods, 60 minutes each. CBT- Computer Aided Instruction. CBT- Windows NT. 12 period lesson overall, but AN/ARC-210 itself 3-hour course (lecture). There is aircraft time integrating AN/ARC- 210, which has some HAVEQUICK capability (not too intense).

(b) CBT- Computer aided instructor

(c) CBT – Windows NT. Twelve hour lesson overall, but AN/ARC-210 itself three hour course (lecture). There is aircraft time integrating AN/ARC-210 which has some HAVEQUICK capability (not too intense)

2. Does training fit into the training continuum appropriately (i.e., dealt with correctly)?

(a) Okay, focus needs to go more toward 182 to 210 (beyond AM/FM and new technologies and functions of the 210).

(b) AN/ARC-210 fits in the course like it should.

(c) The trainer is a SAMT> - Simulated Avionics Maintenance Trainer.

3. Is the training effective? What works?

(a) Not aware of any CBT

(b) Hands on! Classroom not popular!

(c) There does not seem to be a trend of problems w/ the concept. System is complex. We do not want to saturate them especially since there are twenty-something other systems.

4. What doesn't and how would you change it?

(a) Various versions/LOTS of systems (limits instructors to the training they put out) need to be pinpointed down to really specify the training.

(b) Would not go as in-depth w/radio. Does not need to know about all wiring. Not for initial course.

(c) Frequency hopping, channelization, and "Word of the Day"

5. What's unique about the system that presents training challenges?

(a) Concept of frequency hopping (characterization + WOD) (not so much different modes)

(b) The different modes. Schematics. , HAVEQUICK 1, HAVEQUICK 2, SINCGARS, and how to get into each one. Instructor just was introduced when arriving here.
(c) Coursework is developed usually by people from the fleet, which makes training very limited. When testing equipment, etc….

6. How often is training provided on the system?

(a) No response
(b) Taught once. There is a career class that goes more in-depth of 210.
(c) Not

7. Does training match up with system operation and maintenance needs?

(a) No
(b) Today's A-School is nothing like it should be.
(c) System usually arrives way ahead of instructional text or pubs. Need more hands on training. Practical application.

If there are deficiencies, what are they?

(a) Need to focus more on the majority of hands on training/ Need more practical application/ Needs more availability of equipment/asset + test equipment driven.
(b) Classes for binary hex- octal (numbering systems used for memory spec procedures that students should have when they arrive here). Takes time for right training.

8. Does the training maximize learning?

(a) No response
(b) No. Simply because equipment is not available. Can not get equipment needed.
(c) There needs to be more visual tools.

9. What system aspects are difficult for students to learn?

(a) Characterization + frequency hopping.
(b) Learning how to use different modes of operation. Pilots get to see it, but not the students.
(c) Frequency hopping.

10. What training or performance challenges exist with the system?

(a) HAVEQUICK
(b) Learning how to use different modes of operation.
(c) Playing catch up w/technology.

11. What aspects of the system are difficult to teach? Why are they difficult?

(a) Characterization + frequency hopping.
(b) Trying to explain how to manually install "word of the day" hopset etc…
(c) Rely on tech info and difficult training from manufacturer.

12. What is the optimum time required on the system? How much time is allotted?

(a) No response
(b) 12 hours is time allotted. 6 hours required on system.
(c) Due to lack of manpower at squadron. Students are sent straight to squadron and later sent back to NAMTRAGRUDET when squadron can release them.

13. Are tools, support equipment, and materials needed for operating and maintaining the system available and utilized during training? If no, what is lacking?

(a) Need to tie in hands on w/theory
(b) Software upgrades, as it should. Aircraft is not capable of doing this. Support equipment not available (readily) could get it.
(c) More updated tools. Using lots of old equipment.

14. Will analogies help illustrate the training curriculum (i.e., diagrams, visuals…)?

(a) Need more lab/hands on -

- Have ECR 8 stations
- CD Rom's
- Trainer. Has 210/HAVEQUICK capability + CYZ-10/DTD
- Course is being revised at Lemoore (not expecting it until next spring)

(b) Hopset, "word of the day", lockset, diagrams would be helpful. CBT does not cover it to full capacity.

(c) Eight individual training stations.

- Has its own ability to go at own pace instead of lacking due to slower learners.
- CYZ10/DTD is on the trainer.
- There is a rewrite of the course taken place now in Lemoore, CA.
- Lab time is 5 periods (a period lasting 60 minutes)
- Aircraft time is four periods.

Additional Comments/Notes:

(a) F-18-specific:

- Really needs a modified jet technically good aircraft for newer equipment
- Have difficulty accessing up-to-date jets for hands on training
- Updated curriculum changes are technology driven
- Process is effective (overly slow)
- Mention SC42-10/DID BUT NOT IN-DEPTH. (Nothing on system interfaces)
- Needs to be updated w/new technology + more in-depth.
- Experience level w/instructors is there but needs to be backed up w/equipment

  Instructors:
- Do not really utilize NATEC reps here
- Rely on (3) key elements of any new system:
  - Technical Background from Manufacturer
  - Differences training from manual
  - Latest version of the Grey Book

(b) No response

(c) To effectively train the students they need to work hands on w/up to date equipment and receive training immediately as new system is implemented. No access to NATEC reps.

APPENDIX D

DEMOGRAPHIC DATA SUMMARY

MCAS NEW RIVER

UH-1N PLATFORM

PAY GRADE	TOTAL YEARS AIRCRAFT MAINTENANCE		TOTAL YEARS SYSTEM EXPERIENCE	
	MEAN	N	MEAN	N
0-2	7.00	1	1.00	1
0-3	4.00	1	3.00	1
E-3	4.38	6	1.35	6
E-4	4.00	3	1.47	3
E-6	11.50	2	1.50	2
E-7	15.00	1	2.00	1
GS-12	25.00	1	4.00	1
TOTAL	**10.13**	**15**	**2.97**	**15**

AH1-UH1 PLATFORM

PAY GRADE	TOTAL YEARS AIRCRAFT MAINTENANCE		TOTAL YEARS SYSTEM EXPERIENCE	
	MEAN	N	MEAN	N
E-4	2.00	1	2.00	1
E-5	4.30	5	2.30	5
E-6	13.50	2	2.50	2
TOTAL	**6.60**	**8**	**2.26**	**8**

CH-46 PLATFORM

PAY GRADE	TOTAL YEARS AIRCRAFT MAINTENANCE		TOTAL YEARS SYSTEM EXPERIENCE	
	MEAN	N	MEAN	N
0-3	5.00	2	4.25	2
E-4	3.00	2	2.00	2
E-5	2.50	1	1.50	1
E-6	14.50	2	2.00	2
TOTAL	**6.25**	**7**	**2.44**	**7**

MCAS NEW RIVER

CH-53 PLATFORM

PAY GRADE	TOTAL YEARS AIRCRAFT MAINTENANCE		TOTAL YEARS SYSTEM EXPERIENCE	
	MEAN	N	MEAN	N
0-3	5.50	3	2.75	3
E-4	2.20	2	0.95	2
E-5	7.15	6	2.92	6
E-6	10.50	2	3.00	2
TOTAL	**6.34**	**13**	**2.40**	**13**

MCAS CHERRY PT.

AV-8B PLATFORM

PAY GRADE	TOTAL YEARS AIRCRAFT MAINTENANCE		TOTAL YEARS SYSTEM EXPERIENCE	
	MEAN	N	MEAN	N
0-4	7.00	3	0.43	3
E-3	9.50	4	0.93	4
E-4	8.90	5	0.74	5
E-5	5.00	2	0.50	2
TOTAL	**7.60**	**14**	**0.65**	**14**

KC-130 PLATFORM

PAY GRADE	TOTAL YEARS AIRCRAFT MAINTENANCE		TOTAL YEARS SYSTEM EXPERIENCE	
	MEAN	N	MEAN	N
0-2	7.00	1	1.00	1
0-3	4.00	1	3.00	1
E-3	4.38	6	1.35	6
E-4	4.00	3	1.47	3
E-6	11.50	3	1.50	3
GS-12	25.00	1	4.00	1
TOTAL	**9.31**	**15**	**2.05**	**15**

MCAS LEMOORE

FA-18 PLATFORM

PAY GRADE	TOTAL YEARS AIRCRAFT MAINTENANCE		TOTAL YEARS SYSTEM EXPERIENCE	
	MEAN	N	MEAN	N
E-5	5.50	5	2.50	5
E-6	12.33	3	2.97	3
0-3	2.50	1	0.80	1
0-4	13.00	1	3.00	1
GS-11	22.00	1	17.00	1
TOTAL	**11.07**	**11**	**5.25**	**11**

MCAS MIRAMAR

CH-46E PLATFORM

PAY GRADE	TOTAL YEARS AIRCRAFT MAINTENANCE		TOTAL YEARS SYSTEM EXPERIENCE	
	MEAN	N	MEAN	N
E-4	3.17	3	3.00	3
E-5	4.25	2	2.50	2
E-6	14.00	1	4.00	1
0-3	2.92	6	2.33	6
0-4	9.00	1	1.00	1
TOTAL	**6.67**	**13**	**2.96**	**13**

CH-53 PLATFORM

PAY GRADE	TOTAL YEARS AIRCRAFT MAINTENANCE		TOTAL YEARS SYSTEM EXPERIENCE	
	MEAN	N	MEAN	N
E-1	2.00	1	2.00	1
E-3	1.87	3	1.30	3
E-4	2.75	6	2.17	6
E-5	4.75	4	2.63	4
E-7	19.00	1	4.00	1
0-3	2.00	5	1.22	5
0-5	15.00	1	2.00	1
TOTAL	**6.76**	**21**	**2.46**	**21**

MCAS MIRAMAR

FA-18 PLATFORM

PAY GRADE	TOTAL YEARS AIRCRAFT MAINTENANCE		TOTAL YEARS SYSTEM EXPERIENCE	
	MEAN	N	MEAN	N
E-3	2.50	1	2.50	1
E-4	9.00	1	1.00	1
E-5	4.00	2	3.00	2
E-6	12.00	1	1.00	1
E-7	19.00	1	3.00	1
0-3	7.67	6	2.00	6
0-4	7.50	2	3.50	2
0-5	17.00	1	5.00	1
W-3	19.00	1	3.00	1
TOTAL	**9.86**	**16**	**2.67**	**16**

MCAS CAMP PENDELTON

AH-1W PLATFORM

PAY GRADE	TOTAL YEARS AIRCRAFT MAINTENANCE		TOTAL YEARS SYSTEM EXPERIENCE	
	MEAN	N	MEAN	N
E-3	0.80	2	0.55	2
E-4	2.50	1	2.50	1
E-5	3.88	4	2.38	4
E-6	8.88	4	2.38	4
0-3	4.60	6	1.67	6
0-4	10.00	1	3.00	1
TOTAL	**5.11**	**18**	**2.08**	**18**

MCAS CAMP PENDELTON

UH-1N PLATFORM

PAY GRADE	TOTAL YEARS AIRCRAFT MAINTENANCE		TOTAL YEARS SYSTEM EXPERIENCE	
	MEAN	N	MEAN	N
E-4	2.10	2	1.65	2
E-5	7.50	1	1.50	1
E-6	7.00	2	2.00	2
E-8	20.00	1	2.00	1
0-3	20.00	1	4.00	1
CW-02	18.00	1	2.00	1
W-3	18.00	1	0.00	1
TOTAL	**13.23**	**9**	**1.88**	**9**

CH-46E PLATFORM				
PAY GRADE	**TOTAL YEARS AIRCRAFT MAINTENANCE**		**TOTAL YEARS SYSTEM EXPERIENCE**	
	MEAN	**N**	**MEAN**	**N**
E-3	1.67	1	1.00	1
E-4	9.17	1	2.67	1
E-5	7.00	2	3.00	2
TOTAL	**5.95**	**4**	**3.34**	**4**

NAS OCEANA

F/A-18 PLATFORM

PAY GRADE	**TOTAL YEARS AIRCRAFT MAINTENANCE**		**TOTAL YEARS SYSTEM EXPERIENCE**	
	MEAN	**N**	**MEAN**	**N**
E-5	5.83	4	1.67	4
E-8	15.00	1	2.00	1
0-3	6.28	7	2.83	7
0-4	12.00	2	1.00	2
TOTAL	**9.78**	**14**	**1.88**	**14**

APPENDIX E

LESSON PLAN SUMMARY

Platform	Topic #	Title	Course Identification Number
F-18	5.0	VERY HIGH FREQUENCY/ULTRA HIGH FREQUENCY (VHF/UHF) COMMUNICATION SYSTEM, SECURE SPEECH SYSTEM AND AUTOMATIC DIRECTION FINDING (ADF) SYSTEM DESCRIPTION AND OPERATION	C-102-9964
KC-130	7.0	COMMUNICATION AND NAVIGATION UPGRADE (AFC-330&332)	C-102-4511
CH-53E	2.0	COMMUNICATION AND IDENTIFICATION SYSTEMS	C-102-9945A
UH-1N & AH-1W	5.0	COMMUNICATION SYSTEMS	C-102-9354A
AV8B		AV-8B AIRCRAFT AVIONICS ORGANIZATIONAL MAINTENANCE ACTIVITY (OMA) CAREER COURSE	C-102-4887
AV8B	4.0	COMMUNICATION SYSTEMS	C-102-9895B
CH-46E	4.0	H-46E COMMUNICATION NAVIGATION CONTROL SYSTEM ORGANIZATIONAL MAINTENANCE COURSE	C-102-3421

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